COLD WAR IMPACTS ON NATIVE NORTH AMERICA

The Political Economy of Radioactive Colonization

> When years before they had first come to the people of the Cebolla land grant they had not said what kind of mineral it was. They were driving U.S. government cars, and they paid the land grant association five thousand dollars not to ask questions about the test holes they were drilling... From that time on, human beings were one clan again, united by the fate the destroyers had planned for all of them, for all living things; united by a circle of death that devoured people in cities twelve thousand miles away, victims who had never known these mesas, who had never seen the delicate colors of the rocks which boiled up their slaughter.
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> —Leslie Marmon Silko
> *Ceremony*

OF all the costs and consequences of the protracted "Cold War" pitting the United States and its "Free World" allies against the "Communist Bloc" after 1945, perhaps the least known—but certainly among the more substantial—have been its impacts upon the indigenous nations of North America. Virtually unremarked in the vast literature on the conflict, these effects extend from the consolidation of what may be history's most-perfected system of internal colonialism to oblique recommendations within at least some sectors of the U.S. government that outright genocide be perpetrated against American Indians.* Along the way, policies which

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*Internal colonialism differs from the classic variety in that the colonized nation, rather than being maintained as an external source of resources and revenue, is incorporated directly into the claimed "domestic" territory of the colonizing power. For the best, or at least most comprehensive, case study, see Michael Hector, *Internal Colonialism: The Celtic Fringe in British National Development, 1536–1966* (Berkeley: University of California Press, 1975). For application of the concept to the situation of American Indians, see, e.g., Robert K. Thomas, "Colonialism: Classic and Internal," *New University Thought*, Winter 1966–67; Menno Bolt, "Social Correlates of Nationalism: A Study of Native Indian Leaders in a Canadian Internal Colony," *Comparative Political Studies*, Vol. 14, No. 2, Summer 1981; and my own "Indigenous Peoples of the U.S.A.: Struggle Against Internal Colonialism," *Black Scholar*, Vol. 16, No. 1, Feb. 1985.

were—and in many instances continue to be—patently genocidal have been visited upon the peoples native to this continent.*

This essay provides an overview of the situation, tracing the evolution, motivations, and effects of such policies, primarily in the United States, with a decidedly secondary emphasis on Canada. It concludes with suggestions as to how the resulting circumstances might be favorably altered, by correcting not only some of the worst material/physical conditions afflicting post–Cold War Native North America, but also the essential structure of relations between indigenous nations and the continent's settler-state governments.

Internal Colonialism

According to the final (1979) report of the federal government's Indian Claims Commission, an entity established by Congress in 1946 to quiet title to the area encompassed by the forty-eight contiguous states, the United States possesses no legal basis for its use and occupancy of approximately one-third of its territory.† Leaving aside historical questions con-

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*Although I subscribe to the much more expansive definition of genocide put forth by Raphaël Lemkin when he coined the term to describe nazi policies during the Second World War, I will for purposes of this essay adhere to the narrower criteria advanced in the United Nations 1948 Convention on Prevention and Punishment of the Crime of Genocide (U.S.T._______, T.I.A.S. No._______, 78 U.N.T.S. 277 (Dec. 9, 1948)). Specifically, these include policies implemented "with intent to destroy, in whole or in part, a national, ethnical, racial or religious group, as such" by means of killing members of the group, inflicting systematic physical or mental harm upon group members, and/or creating other conditions leading to group dissolution. Not only the execution of such policies, but their planning or inciting, as well as conspiring and complicity in them, are delineated as crimes of genocide within the convention. See Raphaël Lemkin, *Axis Rule in Occupied Europe: Laws of Occupation, Analysis of Government, Proposals for Redress* (Washington, D.C.: Carnegie Endowment for International Peace, 1944) p. 79; the complete text of the 1948 convention will be found in Ian Brownlie, ed., *Basic Documents on Human Rights* (Oxford: Clarendon Press, [3rd ed.] 1994) pp. 31–4.

†U.S. Department of Interior, Indian Claims Commission, *Final Report* (Washington, D.C.: 96th Cong., 1st Sess., U.S. Government Printing Office, 1979); U.S. Department of Interior, Public Land Review Commission, *One-Third of the Nation's Land* (Washington, D.C.: 91st Cong., 2d Sess., U.S. Government Printing Office, 1970). The Claims Commission was an interesting subterfuge. It was created in the aftermath of World War II to manufacture a post-hoc appearance of distinction between the nineteenth-century expansionist policies of the United States and more recent ones pursued by the nazi leaders upon whom the United States was preparing to sit in judgment at Nuremberg; Alice Ehrenfeld and Robert W. Barker, comps. and eds., *Legislative Material on the Indian Claims Commission Act of 1946* (Washington, D.C.: unpublished study, n.d.); Bradley F. Smith, *The Road to Nuremberg* (New York: Basic Books, 1981). The commission's mandate was to examine all claims by indigenous peoples inside U.S. borders with respect to the unlawful taking of land and, where these were found to be valid, to assign payment of compensation in amounts equivalent to the estimated value (without interest accrual) of the property at the time it was taken. No consideration whatsoever was given to whether native peoples wished to alienate their national territories. The commission was *not* authorized to restore stolen property to its rightful owners. In this way, it was intended that a misimpression be fostered that the U.S. acquisition of indigenous territory had been uniformly accomplished through "purchase" rather

cerning fraudulent or coerced transfers of land from indigenous nations to the United States (matters which in themselves would serve to invalidate all pretensions to legitimacy by the acquiring government), the commission admitted that after more than thirty years of exhaustive investigation it was unable to discover "any treaty, any agreement, nor even a unilateral act of Congress" by which the country could legally assert jurisdiction over about 750 million acres of territory it had long since grown accustomed to claiming as its own "domestic" property.[1] By most accounts, the same situation prevails in Canada.[2]

One glaring omission in the Claims Commission's report was that even those areas still recognized by the United States as belonging to indigenous nations—about fifty million acres in 1980—had been directly subordinated to the "plenary power" of the federal government, a juridical concept enunciated by the Supreme Court in its 1903 *Lonewolf* opinion.[3] Under this doctrine, completely antithetical to international legal principles, the United States had unilaterally assigned itself the role of "permanent trustee" over American Indian lands and lives, exercising what the court described as an "absolute and unchallengeable authority" to administer or dispose of native assets in whatever manner it saw fit.*

At the time of *Lonewolf*, the government, having overseen the extermination of the great bulk of all native people within its boundaries, was in the process of formally assimilating (digesting) the residue, both territorially and

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than aggression; Thomas LaDuc, "The Work of the Indian Claims Commission Under the Act of 1948," *Pacific Historical Review*, No. 26, 1957; John T. Vance, "The Congressional Mandate and the Indian Claims Commission," *North Dakota Law Review*, No. 45, 1969; Richard A. Nielson, "American Indian Land Claims: Land versus Money as a Remedy," *University of Florida Law Review*, Vol. 19, No. 3, 1973.

* Among the other juridical absurdities expressed by the U.S. high court in *Lonewolf* was the idea that the federal government possessed a sort of "line-item veto" over standing treaties with American Indians, allowing it, on its own initiative, to abrogate whatever provisions it found inconvenient—i.e., those obligating it to perform functions such as guaranteeing native borders, paying annuities, and respecting indigenous sovereignty—while still holding the Indians to their sides of the bargains in terms of land cessions and the like. Such a doctrine held—and holds—no validity whatsoever in international law; Samuel Benjamin Crandell, *Treaties: Their Making and Enforcement* (New York: Columbia University Press, [2nd ed.] 1916); Sir Ian Sinclair, *The Vienna Convention on the Law of Treaties* (Manchester: Manchester University Press, [2nd ed., rev.] 1974). Nor does the notion of "permanent trusteeship" hold up to even minimal scrutiny. Since at least as early as the United Nations 1960 Declaration on the Granting of Independence to Colonial Countries and Peoples (U.N.G.A. Res. 1514 (XV), 15 U.N. GAOR, Supp. (No. 16) 66, U.N. Doc. A/4684 (1961)) it has been a requirement of international law that all states exercising trust authority over other entities inscribe them on a list of "Non-Self-Governing Territories" scheduled for timely decolonization under U.N. supervision; Burnard H. Weston, Richard A. Falk, and Anthony D'Amato, *Basic Documents in International Law and World Order* (St. Paul, MN: West, [2nd ed.] 1990) pp. 343–4.

in terms of population.* The high court's articulation was meant to cast a patina of legal rationalization over the results. Only the discovery (during the 1920s) of substantial mineral deposits within the remote and supposedly worthless tracts to which most of the remaining Indians had been consigned to die off, out of sight and mind of the dominant society, averted this planned extinction (which had been scheduled for consummation by the mid-1930s).[4] By the late 1970s, it was estimated that some two-thirds of all "U.S." uranium reserves, as well as about a quarter of the readily accessible low-sulphur coal, one-fifth of the oil and natural gas, and appreciable quantities of other strategic minerals were situated within reservation boundaries.[5]

Insofar as there were always clear advantages for federal economic planners in holding such assets in trust rather than placing them in the public domain—a matter which, given America's alleged "free market" ideology, required the existence of native peoples as justification—governmental policy was quickly retooled to serve the ends of preservation rather than eradication.[6] The instrument by which this vital transformation was accomplished was the Indian Reorganization Act of 1934, a statute that usurped what was left of traditional indigenous governments, replacing them with federally designed-and-maintained "tribal councils" whose function was/is mainly to sign off on federal "development" programs on the reservations, thus fostering the false impression of native consent to massive resource expropriation.[7]

Under this neatly crafted system of internal colonial domination, the federal government determines which resources will be exploited on which

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*The primary means by which this was to be accomplished was the 1887 General Allotment Act (ch. 119, 24 Stat. 362, 385, now codified at 18 U.S.C. 331 *et seq.*)—which Indian Commissioner Francis Leupp described as a "great engine to grind down the tribal mass"—under provision of which traditional indigenous forms of land tenure were dissolved in favor of the "more civilized" system of individuated land holdings within the reservations. Once each Indian—defined on the basis of a restrictive "blood quantum" formula designed to minimize the number of people eligible—had been allotted his or her individual parcel (averaging 160 acres apiece), the balance of reserved territory was declared "surplus" and opened up to non-Indian usage. Through this mechanism, to which native people never consented, the overall reservation landbase was "legally" reduced by two-thirds, from about 150 million acres at the outset to some 50 million in 1924; Kirk Kicking Bird and Karen Ducheneaux, *One Hundred Million Acres* (New York: Macmillan, 1973); Janet McDowell, *The Dispossession of the American Indian, 1887–1934* (Bloomington: Indiana University Press, 1991). Assimilation policy also worked on a second major track—which was described as an effort to "kill the Indian, spare the man"—through the forced transfer of indigenous children to distant boarding schools, wherein the could be raised in ignorance of their own cultures and indoctrinated in the values and practices of their conquerors; David Wallace Adams, *Education for Extinction: American Indians and the Boarding School Experience, 1875–1928* (Lawrence: University Press of Kansas, 1995). For the quotation from Leupp, see his *The Indian and His Problem* (New York: Scribner's, 1910) p. 93.

reservations, at what pace and for what purpose, by which "vendors," at what royalty rates, under what safety standards, and with what, if any, post-extraction cleanup requirements.[8] The potential superprofits for the government's preferred transnational corporations, many of them defense contractors, are obviously enormous—readily comparable to those accruing through neocolonialist enterprises conducted in other Third World locales—and they have been consistently realized over the past sixty years.[9] This, in turn, has facilitated America's emergence as the globally dominant economic and military power of the late twentieth century.

For Native North Americans, the costs and consequences have been genuinely catastrophic. Despite the fact that the reservation resource profile is sufficient to make Indians—collectively, and on a per capita basis—the wealthiest people on the continent, we remain by far the poorest, with the lowest annual and lifetime incomes of any group. Reservation unemployment averages 60 percent throughout the United States and, in some places, has hovered in the ninetieth percentile for decades.[10] The effects of such acute impoverishment are more indicative of Third World conditions than of those expected within the world's richest and most advanced postindustrial "democracy." Indians suffer an infant mortality rate up to fifteen times the U.S. national average, and, by a decided margin, the highest rates of death from malnutrition, exposure, and plague disease.[11]

All of this translates into an endemic sense of disempowerment and despair which then generates chronic alcoholism and other kinds of substance abuse, a circumstance contributing heavily to spiraling rates of teen suicide, as well as fatalities from accidents and Fanonesque forms of intragroup violence.[12] As of the mid-1980s, reservation-based American Indian men had a life expectancy of 44.6 years in a country where average male life expectancy was 71.8 years. Reservation-based Indian women could expect to live slightly more than three years longer than their men, but non-Indian females displayed a longevity eight years greater than their male counterparts.[13] Unquestionably, Eduardo Galeano's famous observation that the wealth of the United States is absolutely dependent upon its perpetual and parasitical impoverishment of the South holds equally true for the internal colonies of the native North.[14]

Trinity

In mid-1941, it was discovered for the first time by non-Indians that there were uranium deposits in the northern reaches of the Navajo

Reservation called the "Four Corners Region," a high-desert environment where the state boundaries of Arizona, New Mexico, Colorado, and Utah intersect.* Although the mineral was not considered especially valuable at that moment, a limited amount of prospecting began almost immediately, a process which, over the next few years, revealed the contours of what is now called the "Grants Uranium Belt," an almost continuous series of ore pockets stretching roughly two hundred miles across the Colorado Plateau from somewhere west of Tuba City, Arizona, to the area around Albuquerque.[15]

Exploration was intensified in early 1942, after the U.S. entry into World War II, primarily because of the establishment of the Manhattan Project, a highly classified military/scientific effort to develop nuclear weapons for use against Germany and Japan.[16] From that point until July 1945, over 11,000 tons of ore were mined and processed into yellowcake uranium in the Monument Valley and Carrizo Mountain areas of Navajo by a single defense contractor, the Vanadium Corporation of America.[17] The end user of all this material was the Los Alamos National Scientific Laboratory, a huge fortified compound on the Pajarito Plateau, northwest of Santa Fe, created by impounding a tract of land belonging to the San Ildefonso Pueblo.[18] The reasoning bound up in that maneuver is instructive:

> Ironically, the very attributes that protected the Pajarito Plateau from the systematic colonization that engulfed much of New Mexico before the 1940s made it attractive for this secret project. Seeking a remote locale to hide those researching the possibility of creating the single most dangerous human weapon invented up to that time, federal and military officials wanted a place with minimal distraction and little chance of discovery or subversion. The Pajarito Plateau fit such requirements... [It] had never become thoroughly integrated into the economy of modern America, [and] remained as it always had been: remote, peripheral, and marginal to the mainstream.[19]

What was brewed up at Los Alamos was, of course, "Trinity," the first three atomic bombs (uranium fission devices). One of these was test-detonated at the remote Alamagordo Bombing and Gunnery Range—now called the White Sands Missile Range—on July 16, 1945, making the population of the nearby Mescalero Apache Reservation, along with the troops positioned in trenches for experimental purposes, the earliest known victims of nuclear warfare.[20] The test came too late for the remaining pair of devices to be used against the Germans, and barely in time to allow for the strategically unnecessary incineration of the Japanese cities of Hiroshima (August 6, 1945; more than 100,000 dead) and Nagasaki (August 9; at least 50,000 fatalities) in terrifying demonstrations of the newfound American capacity to visit previously unheard-of levels of destruction upon its enemies.[*]

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* Although the Bureau of Indian Affairs office at Grants, New Mexico, is usually credited with discovery of the uranium "belt" bearing the town's name, it was actually a Navajo named Martinez who brought in the first samples; see the fine piece on the matter, "It Was That Indian," by the Laguna poet Simon J. Ortiz in his *Woven Stone* (Tucson: University of Arizona Press, 1992) pp. 295–6.

Temporarily sanguine in its monopoly on such weapons—which its experts predicted would last a decade or more, allowing it to achieve a position of unprecedented world dominance—the United States began to build up its nuclear arsenal at a rather leisurely pace.[21] Indeed, while some mining was continued, there is no evidence that a coherent plan was effected by the Pentagon or allied agencies to extract and process further stocks of uranium during the first two years of the postwar period.[22]

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[*] "The [official] justification for these atrocities was that this would end the war quickly, making unnecessary an invasion of Japan. Such an invasion would cost a huge number of lives, the government said—a million, according to Secretary of State [James F.] Byrnes; a half-million, Truman claimed was the figure given him by General George Marshall... These estimates of losses were not realistic, and seemed to be pulled out of the air to justify bombings which, as their effects became known, horrified more and more people... It was known that the Japanese had instructed their ambassador in Moscow to work on peace negotiations with the Allies. Japanese leaders had begun talking of surrender a year before this, and the Emperor himself had begun to suggest, in June 1945, that alternatives to this end be considered. On July 13, Foreign Minister Shigenori Togo had wired his ambassador in Moscow: 'Unconditional surrender is the only obstacle to peace...' If only the Americans had not insisted on unconditional surrender—that is, if they were willing to accept one condition to surrender, that the Emperor, a holy figure to the Japanese, remain in place [a stipulation the United States later decided was in its own interests in any event]—the Japanese would have agreed to stop the war. Why did the United States not take that small step to save American and Japanese lives? Was it because too much money and effort had been invested in the atomic bomb not to drop it?...Or was it, as British scientist P.M.S. Blackett suggested, because the United States was anxious to drop the bomb before the Russians [who had earlier agreed to do so on August 8] entered the war against Japan?... Blackett says, the dropping of the bomb was 'the first major operation of the cold diplomatic war with Russia'... [He] is supported by American historian Gar Alperovitz, who notes a diary entry for July 28, 1945, by Secretary of the Navy James Forrestal, describing Secretary of State James F. Byrnes as 'most anxious to get the Japanese affair over with before the Russians got in' "; Howard Zinn, *A People's History of the United States* (New York: Harper & Row, 1980) pp. 413–5; quoting P.M.S. Blackett, *Fear, War and the Bomb: Military and Political Consequences of Atomic Energy* (New York: McGraw Hill, 1948); Gar Alperovitz, *Atomic Diplomacy: Hiroshima and Potsdam—The Use of the Atomic Bomb and the American Confrontation with Soviet Power* (New York: Vintage, 1967). Zinn also quotes the U.S. War Department's Strategic Bombing Survey: "Based on a detailed investigation of all the facts and supported by the testimony of the surviving Japanese leaders involved, it is the Survey's opinion that certainly prior to 31 December 1945, and probably prior to 1 November 1945, Japan would have surrendered even if atomic bombs had not been dropped, even if Russia had not entered the war, and even if no invasion had been planned or contemplated"; *Japan's Struggle to End the War* (Washington, D.C.: U.S. Government Printing Office, 1946). A superb overview of these factors, as well as the intrinsic racism bound up in U.S. wartime policy, is provided in Ronald Takaki, *Hiroshima: Why America Dropped the Atomic Bomb* (Boston: Little, Brown, 1995). Also see Gar Alperovitz's exhaustive handling of available evidence in *The Decision to Drop the Bomb* (New York: Alfred A. Knopf, 1995). For what may still be the best interpretation, see William Appleman Williams, *The Tragedy of American Diplomacy* (New York: Dell, [2nd. ed.] 1972).

A serious ore acquisition program was not inaugerated by the recently formed Atomic Energy Commission (the AEC, established by the Atomic Energy Act of 1946 and now repackaged, innocuously enough, as the "Department of Energy") until late 1947.[23] Even then, the pace did not really begin to pick up until the first, and entirely unpredicted, Soviet test detonation of a nuclear device on September 23, 1949.[24] With U.S. dreams of an uncontested, and therefore relatively inexpensive, planetary military hegemony thus abruptly derailed, the situation was to change radically and with an almost equal degree of suddenness.[25] For the world as a whole, and for Native North America in particular, the results would be disastrous.

Advent of the Cold War

In truth, the Cold War had begun years before, at least as early as 1941, and more likely from the moment of the U.S.S.R.'s inception in 1917.[26] Certainly, the internal security posture of the United States both during and after the Second World War tends to bear out such a view, as does the Truman administration's initial postwar policy of "containment," with its attendant pattern of low-intensity military confrontations with international Soviet "subversion and aggression."[27] However, the Russian acquisition of nuclear weapons in 1949, as well as the "loss" of China to Mao's communist insurgency that same year, upped the ante considerably.[28] On September 30, 1950, just in time for the outbreak of the Korean Conflict, Truman embraced a set of top-secret policy recommendations advanced by the National Security Council (NSC 68), calling for a far more bellicose strategy of "rolling back communist gains" on a worldwide basis.[29]

Among other things, NSC 68 called for the comprehensive restructuring of the U.S. economy to accommodate a massive and perpetual military/technological buildup, with emphasis on nuclear weapons, under what were ostensibly "peacetime" conditions. This open-ended program, which would entail a drastic "reduction of Federal expenditures for purposes other than defense [*sic*] and foreign assistance...by the deferment of certain desirable [civic] programs," requiring "a large measure of sacrifice and discipline [on the part] of the American people," was expressly designed to force the Soviet Union into a process of martial competition so vastly expensive as to ultimately bankrupt it.*

In order for these objectives to be attained, it was deemed essential by the NSC that an outright "National Security State" posture be adopted by the United States. This involved not just a burgeoning of the military, but also an expansion of its already sprawling counterpart, the Central Intelligence Agency (CIA).† It also entailed placing a permanent mantle of official secrecy over the basis for most governmental decisionmaking, the systematic indoctrination of the public on all sorts of largely fictional external "threats" the military was needed to defend against, and an across-the-board repression of domestic dissent.[30] Shortly, American society, already beset by an escalating series of officially sponsored spy scares and anticommunist witch-hunts in every quarter from the State Department to

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*Anyone believing that the domestic economic prescription bound up in NSC 68 is in any way anachronistic or unique to the Truman era, should consider Ronald Reagan's February 26, 1982, proposal to cut $41.4 billion (25 percent) from the federal budget for social programs, while on March 8 recommending a 50-percent *increase* in funding for nuclear weapons development and related activities. "Reaganomics," which still holds considerable sway in Washington, was barely more than a recapitualtion of the principles articulated in the 1950 document. In any event, as stated in the original, the idea was to "hasten the decay of the Soviet system [by employing] economic warfare and political and psychological warfare with a view to fomenting and supporting unrest and revolt in selected strategic satellite countries [to] reduce the power and influence of the Kremlin inside the Soviet Union and other areas under its control [and, thereby,] foster the seeds of destruction within" the U.S.S.R.. This was, of course, precisely Reagan's foreign policy recipe. For what may be the best analysis of prereaganite policy implementation in this regard, see Gregg Herken, *The Winning Weapon* (New York: Alfred A. Knopf, 1980). On the early Reagan era, see Chomsky, *Towards a New Cold War, op. cit.* For overviews of effects, see Fred Block, *The Origins of International Economic Disorder* (Berkeley: University of California Press, 1977) and"Economic Instability and Military Strength: The Paradoxes of the 1950 Rearmament Decision," *Politics and Society*, Vol. 10, No. 1, 1980; Noam Chomsky, *World Orders, Old and New* (New York: Columbia University Press, 1995).

†The CIA, which was put together in 1946 and '47, in large part from elements of the wartime Office of Strategic Services (OSS), included not just global intelligence-gathering and -analysis divisions, but an "operations" or "clandestine services" component which was devoted to the active subversion, often through paramilitary means, of ideologically objectionable entities, including governments. This latter dimension of its activities fit well within a second line of attack recommended in NSC 68, that of organizing and supporting anticommunist guerrilla forces within the Soviet sphere—including the U.S.S.R. itself—which would serve over the long run to erode the Kremlin's position politically, economically, and militarily; William Blum, *The CIA: A Forgotten History* (London: Zed Books, 1986). Implementing this strategy entailed a clear nazification of the U.S. defense establishment, at least insofar as it entailed the absorption by the OSS *cum* CIA of Abwehrgeneral Reinhard Gehlen, Hitler's leading anti-Soviet intelligence expert, and the entire apparatus he'd deployed against the U.S.S.R. during World War II. Like Gehlen himself, most of these "operatives" were war criminals or worse—members of the Gestapo and other SS branches, or of openly collaborationist East European fascist movements—but all were shielded from prosecution by the U.S. intelligence "community"; Reinhard Gehlen, *The Service: The Memoirs of General Reinhard Gehlen* (New York: World, 1972); Christopher Simpson, *Blowback: America's Recruitment of Nazis and Its Effects on the Cold War* (New York: Collier Books, 1988).

Hollywood,* was wracked by the full force of McCarthyism (so-called in reference to the "investigative" activities of Wisconsin Senator Joseph R. McCarthy).[31]

The centerpiece of the carefully orchestrated national hysteria which brought McCarthy to the fore was the show trial of a small group of technicians—notably, Julius Rosenberg and Morton Sobell—who had worked on the Manhattan Project, allegedly using their positions to pass nonexistant U.S. nuclear secrets to the Soviets.† The "treason" of these "atom spies" supposedly accounted for the ability of the "Reds" to build a bomb years earlier

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*The signal investigation of the late 1940s was that involving State Department officials such as Harry Dexter White, accused by a raft of paid witnesses of having acted as real or de facto Soviet agents, selling out American interests to the "international communist conspiracy," especially in Europe and China; David Rees, *Harry Dexter White: A Study in Paradox* (New York: Coward, McCann & Geoghegan, 1973). It was in this context that the FBI was able to manufacture evidence leading to the perjury conviction of Alger Hiss, a former officer at State who had convened the first assembly of the United Nations before going on to work for the Carnegie Endowment for World Peace. Highly sensationalized, this bogus result was peddled to the public as "proof" that the "international communist conspiracy" had penetrated the highest reaches of the American foreign policy establishment, thus accounting for any international posture short of outright U.S. bellicosity in international affairs; Fred J. Cook, *The Unfinished Case of Alger Hiss* (New York: William Morrow, 1958); Alger Hiss, *In the Court of Public Opinion* (New York: Alfred A. Knopf, 1957); Judith Tiger, ed., *In Re Alger Hiss* (New York: Hill & Wang, 1978). Forty years later, after the dissolution of the Soviet Union, its espionage files were searched for any indication that Hiss had been a spy. "Not a single document substantiates the allegation that Mr. A. Hiss collaborated with the Soviet Union," reported General Dimitri Volkogonov; Victor Navasky, "Alger Hiss," *The Nation*, Dec. 9, 1996. On the Hollywood hearings and purges, designed to ensure that American cinema fit into its assigned niche within the official propaganda matrix by restricting its content to only the most "patriotic" fare, see Gordon Kahn, *Hollywood on Trial* (New York: Boni & Gaer, 1948); Robert Vaughn, *Only Victims: A Study of Show Business Blacklisting* (New York: Putnam's, 1972); Dalton Trumbo, *The Time of the Toad: A Study of Inquisition in America* (New York: Harper & Row, 1973). On the quality of the accusatory testimony involved in all this, see Harvey Matusow's autobiographical confession, *False Witness* (New York: Cameron & Kahn, 1955); also see Hyman Lumer, *The Professional Informer* (New York: New Century, 1955) and Herbert L. Packer, *Ex-Communist Witnesses* (Stanford, CA: Stanford University Press, 1962).

†As was admitted as early as 1949 by the Joint Congressional Committee on Atomic Energy, the physics underlying Trinity were no secret at all. From there, it was only a matter of how to manufacture and assemble bomb components, a problem, the solution to which—even if the "atom spies" had provided complete instructions (and no evidence was ever introduced showing that they did)—might have accelerated Soviet bomb production by a few months, not years; Fred J. Cook, *The FBI Nobody Knows* (New York: Macmillan, 1964) pp. 366–7. It is clear that the case presented against Julius Rosenberg, his wife Ethel, and Morton Sobell was largely fabricated. Indeed, it is conclusive that the FBI in particular was aware that Ethel Rosenberg was entirely innocent of the charges brought against her. That she received a death sentence along with her husband—Sobell was sentenced to thirty years' imprisonment—was part of an elaborate ruse designed to coerce Julius into disclosing information about Soviet espionage operations he almost certainly never possessed. The result was that both Rosenbergs were executed at New York's Sing Sing prison on the night of June 19, 1953; Curt Gentry, *J. Edgar Hoover: The Man and His Secrets* (New York: W.W. Norton, 1991) pp. 401–34. Also see Malcolm P. Sharp, *Was Justice Done? The Rosenberg-Sobell Case* (New York: Monthly Review Press, 1956); John Wexley, *The Judgement of Julius and Ethel Rosenberg* (New York: Ballantine, 1977).

than U.S. intelligence analysts had predicted, a matter which placed "the entire citizenry of the Free World in the most extreme peril."* In the trial's aftermath, McCarthy convened well-publicized hearings on what he described as Soviet infiltration of literally the entire "defense" establishment.† Even the ranks of the scientists who had overseen Trinity were purged of "communists and communist sympathizers," that is, anyone exhibiting less than full ideological dedication to America's imperial agenda.‡

While public consciousness was being thus reshaped, the government began to quietly assemble the infrastructure of its military/industrial/scientific complex. While sharply increasing the funding for existing nuclear research centers at Los Alamos, Oak Ridge and Argonne National Laboratories, and Lawrence Laboratories at Livermore, California, the AEC also broke ground for a new weapons production facility at Rocky Flats, sixteen miles upwind from Denver —augmenting the capacity of the existing

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*This oft-quoted phrase accrues from U.S. District Judge Irving R. Kaufman, during his sentencing of the Rosenbergs. Their crime, he said, was "worse than murder" in that it put "into the hands of the Russians the A-bomb years before our best scientists predicted Russia would perfect the bomb, [causing] the Communist aggression in Korea, with the resultant casualties exceeding 50,000 and who knows but what…millions more innocent people may the price of your treason"; quoted in Ronald Radosh and Joyce Milton, *The Rosenberg File: A Search for the Truth* (New York: Holt, Rinehart & Winston, 1983) p. 284. It should be noted that the "communist aggression" referred to concerns the effort of Korea to reunify itself after being arbitrarily partitioned by the United States as a part of Truman's postwar containment policy; Clay Blair, *The Forgotten War: America in Korea, 1950–1953* (New York: Times Books, 1987).

†It should be noted that from 1789 until 1947, during which time its role was relatively defensive, the federal executive branch included an entity called the Department of War. In the latter year, at which point the War Department was being retooled for primarily offensive purposes, it was redesignated as being a "Department of Defense." Through such linguistic obfuscations does a good propaganda system function. In any event, by the point McCarthy undertook to purge the defense establishment of ideological impurity, comparable processes were underway in an array of social sectors ranging from public school faculties to the university professorate, from the labor unions to the media, the arts and all areas of government service. For the best overview, see David Caute, *The Great Fear: The Anti-Communist Purge Under Truman and Eisenhower* (New York: Simon & Schuster, 1978). Other fine studies include Robert Griffith, *The Politics of Fear: Joseph R. McCarthy and the Senate* (Lexington: University of Kentucky Press, 1970); Fred J. Cook, *The Nightmare Decade: The Life and Times of Joe McCarthy* (New York: Random House, 1971); David M. Ohshinsky, *A Conspiracy So Immense: The World of Joe McCarthy* (New York: Free Press, 1983).

‡The classic example is that of J. Robert Oppenheimer, who had headed up the Manhattan Project. After Hiroshima and Nagasaki, he became increasingly vocal in his opposition to the development and proliferation of nuclear weapons, especially the new and more powerful fusion (hydrogen) devices. In 1953, he was declared a "potential security risk" on this basis and, a year later, with his clearances revoked, he was forced out of atomic research altogether; Charles P. Curtis, *The Oppenheimer Case: The Trial of a Security System* (New York: Simon & Schuster, 1955); Philip M. Stern, *The Oppenheimer Case: Security on Trial* (New York: Harper & Row, 1969). More broadly, see Morton Grodzins and Eugene Rabinowitch, eds., *The Atomic Age: Scientists in National and World Affairs* (New York: Basic Books, 1962).

plant, situated within the Hanford Military Compound, a large tract abutting the Yakima Indian Reservation in eastern Washington.[32] The extent of corporate interface was soon clear.

> By 1952, thirteen nuclear reactors had been built for weapons production. General Electric built reactors at Hanford, Westinghouse at Argonne, Illinois. Union Carbide ran Oak Ridge [Tennessee]. DuPont was chosen to design, build, and run a giant facility for plutonium waste reprocessing and storage on South Carolina's Savannah River. All government work was contracted out to private firms; the government did not do any direct hiring except for the AEC bureaucracy. From research work to weapons construction, the job was—and is now—done by private firms, think tanks, universities. The new infusion of [taxpayer provided] capital ensured the heavy participation of private industry.[33]

This structural overlap of public finance and private profit was set in concrete through amendment of the Atomic Energy Act in 1954, allowing corporate ownership of reactors and patent rights vis-à-vis the applications discovered for use of fissionable materials, prerogatives formerly reserved for the AEC.[34] The icing on the cake of corporate profit was the passage of the Price-Anderson Indemnity Act in 1957, a statute mandating that public tax revenues would be used to underwrite liability in the event of nuclear accident, even in privately owned facilities.* In order to peddle such an obvious boondoggle to a somewhat skeptical body politic, the government added a carrot to the stick of "national defense."

This took the form of "the friendly atom"—the notion that nuclear power, "properly applied," would ultimately meet the electrical consumption requirements of America, and perhaps the world as a whole, in a clean, efficient, cost-effective, and utterly inexhaustible fashion—a line heavily propagandized by the Eisenhower administration, beginning with the president's "Atoms for Peace" speech in December 1953.† A few months later, the AEC launched a five-year reactor development program.[35]

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*The act, renewed every decade since it was passed, provided that taxpayers would underwrite $500 million in damages in the event of nuclear accident while requiring responsible corporations to come up with only $60 million—later raised to $125 million—drawn from an industry-wide insurance pool. "In passing the legislation, Congress took the spectre of financial responsibilty in case of accident away from the utilities and nuclear hardware manufacturers"; Gyorgy, et al., *No Nukes, op. cit.*, p. 10; for further details, see Jim Falk, *Global Fission: The Battle Over Nuclear Power* (New York: Oxford University Press, 1982) pp. 78–81.

†Eisenhower also described export of uranium, as applicable to weapons development as to fueling power generation facilities, as a boon to the U.S. trade balance. It is therefore instructive that of 50,000 kilograms earmarked by the AEC for international sale, 90 percent were committed to NATO countries; Robert Rienow and Leona Train Reinow, *Our New Life with the Atom* (New York: Thomas Crowell, 1959) p. 135. By the end of the decade, at least 2.2 million Americans, the majority of them

> The first contract was signed in the summer of 1956 with the Yankee Atomic Electric Co., a corporation owned by several New England utilities, for a 185-Mw Westinghouse pressurized water reactor (PWR) in Rowe, Mass. Other permits were issued for Consolidated Edison's PWR at Indian Point, New York, and Commonwealth Edison's G.E. reactor at Dresden, Ill. A construction permit was also [granted] for the first commercial fast breeder, the Enrico Fermi plant in Monroe, Michigan.*

Such "civilian" uses of atomic energy had military implications, of course, from lending a benign appearance to whole areas of nuclear research which might otherwise have come to seem menacing much sooner than they did, to stabilizing the basis upon which power generation for key sectors of the politicomilitary command-and-control structure would function during wartime, to providing the raw material from which depleted uranium ammunition would eventually be made.† Given the sensitive nature of the materials and technologies

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school children, had seen the AEC's traveling multimedia propaganda exhibition, "Atoms for Peace," Cultural Workers Collective, *Workbook on Nuclear Power* (Amherst, MA: Cultural Workers Collective, 1977) p. 102. For a solid dose of Eisenhower-era pro-nuke propaganda, replete with official quotes, see, e.g., Ralph E. Lapp, *The New Force* (New York: Harper & Bros., 1953) and *Atoms and People* (New York: Harper & Bros., 1956); Arnold Kramish and Eugene M. Zuckert, *Atomic Energy For Your Business: Today's Key to Tomorrow's Profits* (New York: David McKay, 1959). Ample indication of the staying power of such tripe will be found in Glenn T. Seaborg and William R. Corliss, *Man and Atom: Building a New World Through Nuclear Technology* (New York: E.P Dutton, 1971).

* Gyorgy, et al., *No Nukes, op. cit.*, p. 10. Despite the fact that the AEC's sole attempt to build a functional fast breeder reactor, at its Idaho Falls testing station, had resulted in a near-catastrophic meltdown in November 1955, Detroit Edison was licensed to build the 300-times more powerful Fermi facilty barely a year later, before anything resembling a full assessment of health and safety questions had been attempted (3 million people lived within a thirty-mile radius of the site). Although United Auto Workers President Walter Reuther obtained a court order enjoining Detroit Ed from proceeding, construction continued on AEC authority. The plant opened in February 1966—at a cost of over $130 million to taxpayers—and experienced a near meltdown on October 5 of the same year. Various experiments were undertaken to render the reactor operational before it was finally decommissioned altogether in 1972; John G. Fuller, *We Almost Lost Detroit* (New York: Reader's Digest, 1975).

† "The top lobbyist for the nuclear industry, the president of the Atomic Industrial Forum, has confirmed [that] commercial fission began, and was pursued, only because government leaders wanted to justify continuing military expenditures in nuclear-related areas and to obtain weapons-grade plutonium"; K.S. Shrader-Frechette, *Buying Uncertainty* (Berkeley: University of California Press, 1993) p. 15; also see S. Novik, *The Electric War* (San Francisco: Sierra Club Books, 1976) pp. 32–3. As concerns depleted uranium, beginning in the late 1960s, weapons manufacturers like the Olin Corporation and Aerojet Ordnance began to experiment with the use of the substance in both small arms and artillery ammunition. In the former application, the softeness of the material—flattening upon impact with the human body, thus creating gaping "explosive type wounds"—lent itself to technical compliance with Geneva Convention prohibitions against military usage of hollowpoint, dum-dum, and soft lead slugs while clearly circumventing the law's intent (the .556 mm. M-16 super-high-velocity "tumbling" ammunition perfected by Colts Arms at about the same time represented a comparable "innovation"). By the mid-'70s, depleted uranium (DU) flechettes had also been developed for use in shotguns and cluster bombs. The great weight of DU uranium also makes it an ideal material for use in artillery-fired armor-piercing projectiles. An added "advantage" in all cases is that

employed, the peddling of "the friendly atom" also facilitated public acceptance of an ever more ubiquitous internal security apparatus.[*] Most of all, it provided a convenient means of funneling vast subsidies into the rapidly growing "defense industry" without including such appropriations in the Pentagon budget.[†]

This, in turn, enabled the Pentagon to lavish its funds, not simply on the development and production of nuclear weaponry, but upon the perfection of more sophisticated "delivery platforms"—the B-52 strategic bomber, for instance, as well as nuclear attack submarines and an array of rockets and ballistic missiles[‡]—and precision electronic paraphernalia allowing better targeting,

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anyone or anything hit by the stuff is highly irradiated, thereby increasing "kill rates"; Eric Prokosh, *The Simple Art of Murder: Anti-Personnel Weapons and Their Developers* (Philadelphia: National Action/Research on the Military-Industrial Complex, 1972); Dr. Malvern Lumsden, *Anti-Personnel Weapons* (Stockholm: International Peace Research Institute, 1975); Philip L. Bolté, "The Tank Killers: Tunsten vs. Depleted Uranium," *National Defense*, May/June 1983; Paul Seideman, "DU: Material with a Future," *National Defense*, Jan. 1984. It should be noted that such ordance, especially Olin's armor-piercing artillery rounds, was used extensively by the U.S. in its 1991 war against Iraq and may therefore account, at least in part, for a mysterious illness—the "Gulf War Syndrome"—which has subsequently appeared among thousands of American troops who fought there; Bill Mesler, "The Pentagon's Radioactive Bullet," *The Nation*, Oct. 21, 1996.

[*] As one French theorist has observed, the very toxicity of the substances inherent to any utilization of atomic energy, whether for military or ostensibly nonmilitary purposes, lead unerringly to a given sociopolitical result: the proliferation of draconian security measures—to prevent contamination—which would be otherwise unacceptable in many societies. "Nuclear society implies the creation of a caste of militarized technicians, who obey like a medieval knighthood its own code and internal heirachy, who are exempt from the common law and are invested with extensive powers of control, surveillance, and regulation... The nuclear knighthood will include tens of thousands of members and will supervise hundreds of thousands of civilians. It will rule as a military apparatus in the name of techical imperatives required by the nuclear megamachine"; André Gorz, "From Nuclear Energy to Electric Fascism," in his *Ecology as Politics* (Boston: South End Press, 1980) pp. 109–10. Also see D. Warnock and K. Bossong, eds., *Nuclear Power and Civil Liberties: Can We Have Both?* (Washington, D.C.: Citizens Energy Project, 1978).

[†] The allocation of tax monies to fund creation of the "civilian" nuclear infrastructure had reached $14 billion annually by 1956 (an amount equal to more than $60 billion at 1996 exchange rates). Correspondingly, the "physical plant and equipment [underwritten] by the federal government [was] greater than the combined value of the [non-federally funded] plant and equipment of the American Telephone and Telegraph Company, General Motors, and United States Steel put together... One plant [Savannah River] built for the AEC by E.I. DuPont de Nemours Corporation cost twice as much as the total value of all plants and facilities owned by DuPont at the time"; Kramish and Zuckert, *Atomic Energy, op. cit.*, p. 11.

[‡] The development of ballistic missiles involved a second major nazification of the U.S. defense establishment. This accrued through its heavy reliance upon the talents of Werner von Braun and his team of some 1,200 scientists and engineers, who had created the V-2 for the Third Reich during World War II. Von Braun, of course, was not only a member of the Nazi Party (as were most of his men), but had made massive use of slave labor in producing the German weapon. He and his associates were in effect immunized for their well-documented crimes against humanity by the United States after the war, and brought to America to head up missile development for the Pentagon. The mentality of those who facilitated this painless "rehabilitation" speaks for itself, being no different in principle from that of any other nazi apologist; Simpson, *Blowback: America's Recruitment of Nazis, op.cit.*, pp. 27–39.

detection and communications.* As these billions of dollars in additional revenues poured into the coffers of corporations like Lockheed, Boeing, McDonnell-Douglas, Grumman, Westinghouse, GE, AT&T, ITT, and Litton Industries, the U.S. economy—indeed, that of the world—underwent an astonishing process of deformation. By 1959, the concentration of wealth among the Pentagon's preferred contractors virtually guaranteed their control over resources and populations, both at home and abroad, in a manner not unlike that evidenced thoughout the internal colonies of Native North America.†

It was in this context, with greater and greater realms of power accumulating in fewer and fewer unelected hands, that even President Dwight David Eisenhower, a former five-star general and avid cold warrior (but apparently a man of at least some degree of democratic sensibility) was to warn before leaving office in January 1960 that the system he himself had done so much to create was threatening, like Frankenstein's monster, to break free of control.[36] Ike's expostulation went unheeded, however, as his "liberal" successor, John F. Kennedy, citing a nonexistent "missile gap" in which he claimed the United States had fallen far behind the U.S.S.R. in its capacity to launch intercontinental nuclear strikes, accelerated rather than reduced America's pursuit of ascendancy in the "strategic arms race."‡

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*As with missiles, nazification was integral to postwar U.S. electronics development and related military research. "The U.S. share of...scientific and technical booty from all over Germany...included the engineers, technicians, and fifty ME-162 jet turbines—the most advanced in the world—from the Messerschmidt factory at Schönebeck; virtually the entire scientific staff from the Siemens and Zeiss companies; leading chemical and electrical engineers and their equipment from I.G. Farben and Telefunken"; ibid., p. 31.

†It has been reliably estimated that these and about thirty other major defense contractors netted upward of $60 billion—more than $200 billion in 1996 dollars—in research, development, and production allocations during the Eisenhower years alone; William F. Barber and C. Neale Ronning, *Internal Security and Military Power* (Columbus: Ohio State University Press, 1966) p. 13. Also see Nicole Ball and Milton Leitenberg, eds., *The Structure of the Defense Industry* (New York: St. Martin's Press, 1983). By the 1960s, the resulting situation—which involves, not free markets and laissez-faire, but central planning and the systematic governmental transfer of public wealth into corporately private hands—was so pronounced that it had become a mainstay of political-economic analysis from all ideological perspectives; see, e.g., John Kenneth Galbraith, *The New Industrial State* (Boston: Houghton Mifflin, 1967); Ralph Milibrand, *The State in Capitalist Society: An Analysis of the Western System of Power* (New York: Basic Books, 1969); Paul M. Sweezy and Harry Magdoff, *The Dynamics of U.S. Capitalism: Corporate Structure, Inflation, Credit, Gold, and the Dollar* (New York: Monthly Review, 1972). On the impact of this trend abroad, especially in the Third World, see, e.g., Neil Smith, *Uneven Development: Nature, Capital and the Production of Space* (Oxford: Basil Blackwell, 1984); Samir Amin, *Maldevelopment: Anatomy of a Global Failure* (London: Zed Books, 1990).

‡"[D]eployment of the B-52 jet bomber began in 1955 while the mythical 'bomber gap' was used to muster public support for such spending. The Soviets, being hopelessly outclassed...launched the first intercontinental ballistic missile (ICBM) in 1957. This achievement was soon surpassed by the U.S....

Plainly, all the essential ingredients defining the contours of successful American participation in the Cold War were in place by 1951, probably earlier. Their functioning was, however, entirely contingent upon a trio of distinct but closely related needs—a sufficent supply of uranium ore, localities in which the ore could be processed and converted into weapons, and areas in which these weapons and their delivery systems could be tested—none of which had been adequately worked out by that point. Ten years later, a fourth need—locales in which the waste by-products of the whole nuclear cycle might be permanently stored or otherwise disposed of—was to become an increasingly pressing issue.[*]

The problem was, and remains, that each of these four requirements generates collateral contamination of the environment of varying intensities and durations, but all of it extremely carcinogenic and mutogenic.[37] Both secrecy and propaganda had their limits. There was quite simply no way in which the mainstream American public could be exposed to the brunt of such contamination, thereby suffering the endemic health consequences which could be expected to result, while sustaining the level of popular enthusiasm for nuclear "investment" desired by federal planners.[†] Insofar as

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[However, a 1959 report] probably written by Paul Nitze, created the famous 'missile gap,' which was later shown to be just as fictitious as the earlier 'bomber gap.' It was not until 1964 that the Soviets actually had 100 ICBMs, but by then the U.S. had 400. Meanwhile, the 'missile gap' was used [by Kennedy] to justify the deployment of U.S. Minuteman ICBMs and the Polaris submarine-launched missile system"; Robert C. Aldridge, *Nuclear Empire* (Vancouver, B.C.: New Star Books, 1989) p. 9. For further details on the falsity of Kennedy's posthumous image as a "dove," see Noam Chomsky, *Rethinking Camelot: JFK, the Vietnam War, and U.S. Political Culture* (Boston: South End Press, 1993).

[*] No thought at all seems to have been given to the ultimate disposition of tailings and other by-products which attend mining and milling in truly massive quantities. In the early days of U.S. nuclear develpment, disposal/storage of spent fuels and similar wastes was also not considered a significant problem since it was estimated that upward of 90 percent of such material could be perpetually reprocessed/reused (thus, among other things, eventually reducing the cost of enriched uranium by as much as one-third). It was only after 1965, when it began to become apparent that reprocessing was not a technically/economically viable option that the disposal issue assumed a critical edge, and not until 1982 that Congress finally passed the Nuclear Waste Policy Act through which taxpayers were, as always, burdened with the expense; "LWR [Light Water Reactor] Spent Fuel Disposition Capabilities," *ERDA [Energy Research and Development Administration] Newsletter*, May 19, 1977; U.S. House of Representatives, Committee on Interior and Insular Affairs, Subcommittee on Energy and the Environment, *Hearings on the Nuclear Waste Policy Act* (Washington, D.C.: 100th Cong., 1st Sess., U.S. Government Printing Office, 1988).

[†] The bizarre proposition that John Q. Public was somehow "investing" in the creation of a technological infrastructure he did not own, from which he could never gain financially (even hypothetical profits invariably being "reinvested" with neither his knowledge or consent), over which it had no control and about which he in most instances had no accurate information is still being peddled today. To trace the evolution of this bill of goods, see Kramish and Zuckert, *Atomic Energy, op. cit.*; David L. Scott, *Financing the Growth of the Electric Utilities* (New York: Praeger, 1976); U.S.

possible, then, the environmental/health effects of everything from uranium mining and milling to the disposal of radioactive wastes had to be displaced into expendable geographies and onto equally expendable populations.

Although other possibilities were explored over the years, especially with respect to testing, the imagined solutions to such dilemmas were located, by and large, in the "Great American Desert" of the far western regions of the continental United States, conveniently out of sight and mind of the bulk of America's citizens. In these sparsely inhabited areas, taken up mainly by the internal colonial archipelago of American Indian reservations and treaty territories, it was intended that the physiological costs of the country's nuclearization be foisted off more or less exclusively on the indigenous peoples who resided there.[38] To appreciate the extent to which this is true, it is necessary to examine in some detail the evolution of each the four critical elements at issue.

Mining

In 1947, when the AEC began its first, very limited, postwar uranium ore acquisition program, it hit upon an interesting cost-control measure. Since significant uranium deposits along the Grants Belt were known to be concentrated on the Navajo Reservation, and since most Diné (Navajos) had been rendered destitute by federal impoundment of their livestock over the preceeding decade, it was estimated that sufficient ore could be produced by recruiting desperate Indians to undertake individual mining operations.*

Department of Energy, Nuclear Information and Resource Service, *Nuclear Power and National Energy Strategy* (Washington, D.C.: U.S. Government Printing Office, 1991).

*The conventional explanation of the massive stock impoundments on Navajo during the 1930s and '40s—a maneuver which left the reservation's highly self-sufficient population dependent upon the government for survival—has always been that the Diné were heavily overgrazing their land, a circumstance requiring federal intervention to prevent erosion and other environmental degradation; George A. Boyce, *"When the Navajos Had Too Many Sheep": The 1940s* (San Francisco: Indian Historian Press, 1974); Ruth Roessel, ed., *Navajo Livestock Reduction* (Chinle, AZ: Navajo Community College Press, 1975). While this rationalization holds a superficial merit when considered in a policy vacuum, it quickly loses its plausibility when juxtaposed to the eagerness of the very agencies overseeing the impoundments to issue permits for energy corporations to strip-mine the areas they were supposedly protecting thereby. While the effects of overgrazing are largely reversible over a fairly short period, the impact of mineral stripping is permanent in arid locales such as Navajo; Thadias Box, et al., *Rehabilitation Potential for Western Coal Lands* (Cambridge, MA: Ballinger, 1974). The most reasonable policy interpretation is thus one of forcing the Diné into a posture of providing cheap labor to transient mineral extraction interests; Phil Reno, *Navajo Resources and Economic Development* (Albuquerque: University of New Mexico Press, 1981); Donald A. Grinde and Bruce Johansen, *Ecocide of Native America: Environmental Destruction of Indian Lands and Peoples* (Santa Fe: Clear Light, 1995) esp. pp. 113–6.

Working through the Department of Labor's Small Business Administration (SBA) and the Interior Department's Bureau of Indian Affairs (BIA), the AEC was even able to promote the proliferation of these tiny "mom and pop" shaft mines—somewhere between one and two hundred of them by 1951—as a "promising new alternative for economic development on American Indian reservations."[39]

Omitted from such glowing projections was the fact that none of the approximately 500 Indians who were provided with SBA loans to establish themselves as "independent suppliers" for the AEC had been warned of the dire health hazards—well known in industrial/governmental circles since the 1930s—involved in working uranium in unventilated mine shafts.

> [R]adon and thoron gases, [which are emitted by uranium,] readily combine with the molecular structure of human cells and decay into radioactive thorium and [polonium]. Radon and thoron gases, if inhaled, irradiate cells in the lining of the respiratory tract, causing cancer.[40]

Even if the miners had been warned, SBA funds were not provided for purposes of installing the equipment necessary to draw off the gases or the equally toxic dust produced in the act of digging. Instead, the miners were left to unwittingly inhale huge doses of such substances day in, day out for years on end.[41] The entirely predictable result was that, by 1980, the first generation of Diné miners had contracted lung cancer in grossly disproportionate numbers.*

> The AEC [later] claimed that it did not possess information about the public health problems for uranium miners. Unions and Public Health Service physicians disagreed. Dr. Victor Archer at NIOSH [National Institute for Occupational Safety and Health] claimed that European physicians had noted a high incidence of lung cancer in ura-

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*Of the approximately 350 Diné who had worked in the mines before 1955, 25 were dead of lung cancer and at least 45 more had been diagnosed with the disease by 1979; Jack Cox, "Casualties Mounting from U-Rush of '49," *Denver Post*, Sept. 2, 1979; Michael Garrity, "The Pending Energy Wars: America's Final Act of Genocide," *Akwesasne Notes*, Early Spring 1980. In a preview of the far more comprehensive diversion which would afflict the United States by 1990, spokespersons for the uranium industry, tacitly supported by governmental representatives, initially sought to link the epidemic of lung cancer among Diné miners to cigarette smoking; e.g., Bob Beverly, Coordinator of Environmental Control for Union Carbide, quoted in Jack Cox, "Studies Show Radon Guidelines May Be Weak," *Denver Post*, Sept. 4, 1979. The vacuousness of this particular effort to blame personal behaviors rather than systemic causes for mushrooming cancer rates was amply demonstrated when it turned out that most of the victims had never smoked; Dr. Joseph Wagoner, "Uranium Mining and Milling: The Human Costs," unpublished paper quoted in Leslie J. Freeman, *Nuclear Witnesses: Insiders Speak Out* (New York: W.W. Norton, 1982) p. 142. Also see Joseph K. Wagoner, et al., "Radiation as the Cause of Lung Cancer in Uranium Miners," *New England Journal of Medicine*, No. 273, 1965.

> nium miners prior to 1940; the National Commission on Radiation Protection and the International Commission on Radiation Protection were aware of potential hazards of radon gas by the early 1940s… As far back as the [early] 1950s, it was widely known that 70 percent of German and Czech pitchblende and uranium miners who worked in the industries in the 1920s and earlier had died of lung cancer.[42]

Things improved little, if at all, after the AEC dramatically stepped up its ore-buying in 1952, contracting with the Kerr-McGee Nuclear Corporation to open the first major uranium mine on Navajo, outside the town of Shiprock, New Mexico. A hundred Diné were hired to perform the underground labor—at about two-thirds the prevailing off-reservation pay scale for comparable work—in what was ostensibly a ventilated mine shaft.[43] When a federal inspector visited the mine a few months after it opened, however, he discovered the ventilator fans were not functioning. When he returned three years later, in 1955, they were still idle.[44] By 1959, radon levels in the mine shaft were routinely testing at 90–100 times the maximum "safe" levels, a circumstance which remained essentially unchanged until the ore played out and Kerr-McGee closed the mine in 1970.[45]

Of the 150-odd Diné miners who worked below ground at Shiprock over the years, eighteen had died of radiation-induced lung cancer by 1975; five years later, another twenty were dead of the same disease, while the bulk of the rest had been diagnosed with serious respiratory ailments.[46] Much the same situation pertained with regard to native employees working in the shaft at Kerr-McGee's second mining operation on Navajo, opened at Red Rock in 1953.[47] The same rates prevail among the men who worked underground for Kerr-McGee at Grants, New Mexico, the largest uranium shaft-mining operation in the world.[48] Of the original six thousand or so miners of all races employed below ground in the Grants Belt as a whole, NIOSH's Victor Archer has estimated that one thousand will eventually die of lung cancer.[49]

Nonetheless, such mines proliferated on the reservation throughout the remainder of the 1950s, as the AEC, with the active complicity of the BIA, entered into a host of additional contracts, not only with Kerr-McGee, but with corporations like Atlantic-Richfield (ARCO), AMEX, Foote Mineral, Utah International, Climax Uranium, United Nuclear, Union Carbide (a chameleon which was formerly known as the Vanadium Corporation of America, and is now called Umetco Minerals Corporation), Gulf, Conoco, Mobil, Exxon, Getty, Sun Oil, Standard Oil of Ohio (Sohio), and Rockwell International.[50] As of 1958, "the Bureau of Indian Affairs reported that over 900,000 acres of tribal land were leased for uranium exploration and development."[51] From 1946 to 1968, over 13 million tons of uranium ore were mined on Navajo—some 2.5 million tons at Shiprock alone—and still the rate of increase grew.[52] By late 1976, at the very peak of the "uranium frenzy" afflicting the Colorado Plateau, the BIA had approved a total of 303 leases encumbering a quarter-million acres of Navajo land for corporate mining and milling purposes.[53] X

Aside from its effects upon those working underground, the shaft mining on Navajo had an increasingly negative impact upon the physical well-being of their families and communities. Once real ventilation of the mines began to occur during the mid-'60s, the vents were often situated right in the middle of residential areas, whose inhabitants were then forced to breathe the same potent mixtures of radon, thoron and other toxic substances which were plaguing their husbands, fathers, and neighbors underground.[*] Then there was the matter of pumping out the groundwater which constantly seeped into scores of the deeper shafts—a process called "dewatering"—all of it heavily contaminated. To appreciate the volume of this outpouring, it should be considered that just one site, Kerr-McGee's Church Rock No. 1 Mine, was pumping more than 80,000 gallons of irradiated effluents per day into the local supply of surface water in 1980.[54]

> The millions of gallons of radioactive water [released in this fashion] carry deadly selenium, cadmium, and lead that are easily absorbed into the local food chain, as well as emitting alpha and beta particles and gamma rays. Human ingestion of radioactive water can result in alpha particles recurrently bombarding human tissue and eventually tearing apart the cells comprising that tissue...causing cancer [and/or genetic mutation in offspring].[55]

Small wonder that, by 1981, the Navajo Health Authority (NHA) had documented increasing rates of birth defects—notably cleft palate and Downs Syndrome—among babies born after 1965 in mine-adjacent reservation communities like Shiprock, Red Rock, and Church Rock.[56] At the same time, it was determined that children living in such localities were suffering bone cancer at a rate five times the national average, ovarian cancer at a staggering seventeen times the norm.[57] Yet another study concluded that, overall, there was "a twofold excess of miscarriages, infant deaths, congenital or genetic abnormalties, and learning disabilities among uranium-area families (compared with Navajo families in non-uranium areas)."[58] Although funding was requested from the Department of Health, Education and Welfare (DHEW) to conduct more extensive epidemiological studies throughout the Grants Belt, the request was promptly denied.

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[*] The vents of one mine run by the Gulf Oil Company at San Mateo, New Mexico, for example, were located so close to the town's school that the state's Department of Education ordered closure of the institution—but not the mine—because of the obvious health risk to the children attending it. Meanwhile, the local groundwater was found to be so contaminated by the corporation's activities that the National Guard was forced to truck in drinking water (at taxpayer expense); Clemmer, "Energy Economy," *op. cit.*, p. 98.

> In fact, in 1983, one agency, the Indian Health Services [a subpart of DHEW, which was by then redesignated the Department of Health and Human Services] sent a report to Congress...stating that there was "no evidence of adverse health effects on Indians in uranium development areas and there is no need for additional studies or funding for such studies."[59]

Meanwhile, since 1952, an ARCO subsidiary, the Anaconda Copper Corporation, had been operating under AEC/BIA authority on the nearby Laguna Reservation, near Albuquerque. By the early 1970s, the approximately 2,800 acres of Anaconda's Jackpile-Paguate complex at Laguna—from which 22 million tons of ore and more than 44 million tons of other minerals were ultimately removed—was the largest open-pit uranium mine in the world.[60] The excavation went so deep that groundwater seepage became as much an issue as in a shaft mine.

> [Anaconda's] mining techniques require "dewatering," i.e., the pumping of water contaminated by radioactive materials to facilitate ore extraction. Since 1972, the Jackpile Mine has wasted more than 119 gallons per minute through this dewatering procedure. Altogether more than 500 million gallons of radioactive water have been discharged [into] a 260-acre tailings pond [from which it] either sinks back into the acquifer, evaporates, or seeps out into the arroyos and drainage channels of the tiny Río Mequino stream that is fed by a natural spring near the tailings dam.[61]

In 1972, and again in 1977, the Environmental Protection Agency (EPA) notified the Laguna tribal council that both the Río Molino and the nearby Río Paguate, both of which run through the Anaconda leasing area, and which together comprise the pueblo's only source of surface water, were badly contaminated with radium 226 and other heavy metals.[62] This was followed, in 1979, by a General Accounting Office announcement that the acquifer underlying the entire Grants Belt, from which Laguna draws its groundwater, was similarly polluted.[63] The trade-off was, of course, "jobs." But, while most able-bodied Lagunas, and a considerable proportion of neighboring Acomas, were employed by the corporation—a matter touted by the BIA as a "miracle of modernization"—most received poverty-level incomes.* And, although the adverse health effects of open-pit uranium mining seem somewhat less pronounced than those associated with shaft mining, disproportionately high rates of cancer among long-term miners were being noted by the early '80s.[64]

All told, about 3,200 underground and 900 open-pit miners were employed in uranium operations by 1977, and Kerr-McGee was running a multi-million-dollar U.S. Department of Labor-funded job training program in the Navajo community of Church Rock, Arizona, to recruit more.[65] The stated governmental/corporate objective was to create a workforce of 18,400 underground and 4,000 open-pit miners to extract ore from approximately 3.5 million acres along the Grants Belt by 1990.[66] Only the collapse of the market for U.S. "domestic" uranium production after 1980—the AEC met its stockpiling quotas in that year, and it quickly became cheaper to acquire commercially designated supplies abroad, first from Namibia, then from Australia, and finally from the native territories of northern Saskatchewan, in Canada—averted realization of this grand plan.†

As the dust settled around the Four Corners, the real outcomes of uranium mining began to emerge. Although only two-thirds of known uranium resources were located on or near American Indian reservations, some 90 per-

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*About 450 Lagunas, some three-quarters of the pueblo's labor force, as well as 160 Acomas worked for Anaconda at any given moment. Another 15–20 percent of the Lagunas worked for the BIA or other federal agencies. Yet, even under such "full-employment" conditions, the median income on the reservation was only $2,661 per year (about $50 per week). This was less than half what a non-Indian open-pit miner was earning in an off-reservation locale during the same period; Richard O. Clemmer, "The Energy Economy and Pueblo Peoples," in Jorgenson, *American Indians and Energy Development, op. cit.*, p. 99; Kulentz, *Geographies of Sacrifice, op. cit.*, p. 35.

†The 1972 price of U.S.-produced uranium was $6 per pound. By 1979, the figure had risen to $42, a hugely illegal mark-up which contributed greatly to the accrual of U.S. taxpayer-provided corporate superprofits during the final years of the AEC's ore-buying program (as well as the almost instantaneous bust of the domestic market when the program was phased out); David Burnham, "Gulf Aides Admit Cartel Increased Price of Uranium," *New York Times*, June 17, 1977; John D. Smillie, "Whatever Happened to the Energy Crisis?" *The Plains Truth*, Apr. 1986. Shortly after its closure in 1982, Anaconda's Jackpile-Paguate complex was replaced as the world's largest open-pit uranium mine by Rio Tinto Zinc's Rossing Mine, opened in 1976 in Namibia. Uranium from this de facto South African colony, comprising about one-sixth of the "Free World" supply, was sold not only at a rate of less than $10 per pound to the U.S. and other NATO countries—a factor which drove the highly inflated price of U.S.-mined yellowcake back down to $15, thereby "busting" the profitablity of production—but to Israel, supplying that country's secret production of nuclear weapons. It was also used to underpin South Africa's own illicit nuclear weapons development program; Richard Leonard, *South Africa at War: White Power and Crisis in Southern Africa* (Westport, CT; Lawrence Hill, 1983) pp. 60–9. On Australian uranium mining, and the resistance to it spearheaded by aboriginal peoples, see Falk, *Global Fission, op. cit.*, pp. 256–84. On northern Saskatchewan, see note 178, below. Overall, see A.D. Owen, "The World Uranium Industry," *Raw Materials Report*, Vol. 2, No. 1, Spring 1983.

cent of all mining had occurred on or immediately adjacent to them.[67] The AEC's constellation of corporations had profited mightily as a result, and not just by refusing to meet the expense of providing even the most rudimentary forms of worker safety or their having to pay only the artificially depressed wages prevailing within the reservations' colonial economies. The BIA, exercising the government's self-assigned "trust" prerogatives vis-à-vis Indian uranium, had written contracts requiring the corporations to pay royalties pegged at an average of only 3.4 percent of market price in an environment where 15 percent was the normative standard.* Moreover, the contracts often included no clauses requiring post-mining cleanup of any sort, thus sparing Kerr-McGee and its cohorts what would have been automatic and substantial costs of doing business in off-reservation settings. When lucrative mining was completed, the corporations were thus in a position to simply close up shop and walk away.[68]

The impoverished indigenous nations upon which the uranium extraction enterprise had been imposed—who seldom if ever made money from the process and whose prior economies had been demolished in the bargain—were then left holding the bag.† On Navajo, this involves the necessity of dealing with hundreds of abandoned mine shafts ranging from fifty to several hundred feet in depth, some subject to caving in and all of them steadily emitting radon and thoron from their gaping maws.[69] At Laguna, conditions are even worse.* As Dr. Joseph Wagoner, Director of Epidemiological Research for NIOSH, would later put it, with conspicuous understatement, the situation presents "serious medical and ethical questions about the responsibility [not just of the corporations, but] of the federal government, which was the sole purchaser of uranium during [much of] the period."[70]

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* W.D. Armstrong, *A Report on Mineral Revenues and the Tribal Economy* (Window Rock, AZ: Navajo Office of Mineral Development, June 1976); Joseph G. Jorgenson, "The Political Economy of the Native American Energy Business," in his *Native Americans and Energy Development, II, op. cit.*, pp. 9–20. That these rates were approved by "tribal governments" at Navajo, Laguna, and elsewhere means nothing at all insofar as such entities have been created and maintained as instruments of the U.S. colonial administration of Native North America in exactly the same fashion that an "Algerian" government was maintained by colonial France or the Vichy French government by Germany during World War II. Precisely to the point are the observations of Elsie Peshlaskai, an organizer of the Diné resistance to the opening of a mine near the Navajo community of Crown Point, offered in testimony at the National Citizens' Hearings on Radiation Victims in Washington, D.C. (April 12, 1980): In 1979, "I met a lawyer…who showed me a copy of the lease—the United Nuclear Corporation uranium lease negotiating the right to mine and mill and explore the land [where] I was. I was shocked! It had been approved [by the tribal council] in 1971! I couldn't believe it… How come nobody knew about it? The tribal government over in Window Rock wouldn't tell anybody… Thirty-three thousand dollars for 2,500 acres. One dollar for an acre! For rent for one year. And four dollars minimum royalty. I mean, that's nothing… I started to talk to people [and] I found out that the companies had just walked onto the land and started drilling. They hadn't really asked anybody's permission… [The tribal government] must be getting something for it—but the people, no!"; quoted in Freeman, *Nuclear Witnesses, op. cit.*, p. 157.

† The federal program to undermine the Diné self-sufficiency economy has already been mentioned. At Laguna, which had enjoyed an agricultural economy since time immemorial, Anaconda's massive strip mining and related activities—which yielded an estimated $600 million in corporate revenues over thirty years—obliterated much of the arable landbase and irradiated most of the rest; Clemmer, "Energy Economy," *op. cit.*, pp. 97–8.

Milling

Milling, the separation of pure uranium from its ore, is the first stage of the production process. Ore pockets across the Grants Belt range from .4–.3 percent uranium content, yielding an average of about four pounds of yellowcake per ton.[71] The remaining 1,996 pounds per ton of waste—reduced to the consistency of coarse sand called "tailings" during milling—invariably accumulates in huge piles alongside the mills which, for reasons of cost efficiency, tend to be situated in close proximity to mines. Tailings retain approximately 85 percent of the radioactivity of the original ore, have a half-life estimated at 10,000 years, and are a source of continuous radon and thoron gas emissions. They are also subject to wind dispersal and constitute an obvious source of groundwater contamination through leaching.[72]

As with uranium mining, about 90 percent of all milling done in the United States during the AEC's ore-buying program occurred on or just outside the boundaries of American Indian reservations.[73] Also as was the case in the mines, "conditions in the mills were deplorable."[74] Even the most elementary precautions to assure worker protection were ignored as an "unnecessary expense." As Laguna poet Simon J. Ortiz, who was employed in a Kerr-McGee mill during the early '60s, would later reflect:

> Right out of high school I worked in the mining and milling region of Ambrosia Lake. I was nineteen years old... At the mill, I worked in crushing, leaching, and yellowcake,

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*Laguna has been described as the "single most radioactively contaminated area in North America outside of the military reservations in Nevada where nuclear bombs are tested"; Winona LaDuke, interview on radio station KGNU, Boulder, CO., Apr. 15, 1986. Nevertheless, during 1986 "hearings for the environmental impact draft statement for the Jackpile-Paguate mine's reclamation project began with no less than ten Ph.D.'s and other 'technical' experts in a variety of scientific disciplines, including a mining engineer, a plant ecologist, a radiation ecologist, an expert in biomedicine, and others. All testified in obfuscating language that America's largest uranium mine could be safely unreclaimed. All were under contract to the Anaconda Corporation"; Kulentz, *Geographies of Sacrifice, op. cit.*, p. 42; Marjane Ambler, "Lagunas Face Fifth Delay in Uranium Cleanup," *Navajo Times Today*, Feb. 5, 1986.

Navajos at the Kerr-McGee mine removed uranium ore from the earth much as if it were coal in this photograph taken in 1953. Courtesy of AP/Wide World Photos.

> usually at various labor positions... I had a job, and for poor people with low education, no skills and high unemployment, that is the important thing: a job... In 1960, there was no information about the dangers of radiation from yellowcake... In the milling operation at the end of the leaching and settling process, the yellow liquid was drawn into dryers that took the water out. The dryers were screen constructions which revolved slowly in hot air; yellow pellets were extruded and crushed into fine powder. The workers were to keep the machinery operating, which was never smooth, and most of the work was to keep it in free operation; i.e., frequently having to unclog it by hand. There was always a haze of yellow dust flying around, and even though filtered masks were used, the workers breathed in the fine dust. It got in the hair and cuts and scratches and in their eyes. I was nineteen then, and twenty years later I worried about it.[75]

The situation was so acute at Kerr-McGee's first mill on the Navajo Reservation, established at Shiprock in 1953, that after it was abandoned in 1974 inspectors discovered more than $100,000 in uranium dust had settled between two layers of roofing. Former workers recalled having been routinely instructed by their supervisors to stir yellowcake by hand in open, steam-heated floorpans.[76] Needless to say, by 1980, those who had been lured into the mills with the promise of a small but steady paycheck during the 1950s and '60s were suffering rates of lung cancer and other serious respiratory illnesses rivaling those of their counterparts in the mines.*

The greater impact of milling, however, has been upon the broader Diné, Laguna, and Acoma communities. The environmental degradation inflicted by a single mill, the Kerr-McGee plant at Grants—once again, the largest such facility in the world—may equal that of all the shaft mines along the uranium belt combined. At its peak, that monstrosity processed 7,000 tons of ore per day, piling up 23 million tons of tailings in a hundred-foot-high mound which covers 265 acres.[77] And this is just one of more than forty mills operating simultaneously on and around Navajo during the late '70s.[78] A similar situation prevailed at plants established by Kerr-McGee, Sohio-Reserve, Bokum Minerals, and several other corporations in the immediate vicinty of Laguna and Acoma.[79]

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*In 1979, several former mill workers with terminal lung cancer joined with eleven similarly afflicted Red Rock miners and the families of fifteen who'd already died in suing the AEC and Kerr-McGee for what had been done to them; "Claims Filed for Red Rock Miners," *Navajo Times*, July 26, 1979; Marjane Ambler, "Uranium Millworkers Seek Compensation," *APF Reporter*, Sept. 1980. In response, "The nuclear industry...commissioned studies which blame [the problem] on smoking, not radiation. 'I'm personally convinced that smoking is helping cause [the cancers] or is the main cause,' [concluded] Dr. Robert W. Buechley, director of the industry-funded study...[He also claimed] researchers had found no excess cancers in New Mexico Navajos"; Freeman, *Nuclear Witnesses, op. cit.*, pp. 141–2; Cox, *Native People, Native Lands, op. cit.* Only one of the plaintiffs had ever smoked.

> At the Bluewater Mill, eighteen miles west of the Laguna Reservation [on the western boundary of Acoma, a thirty-mile trip by rail from the Jackpile-Paguate complex, with the raw ore hauled in open gondolas] near the bed of the San Jose River, Anaconda has added a 107-acre pond and a 159-acre pile comprising 13,500,000 tons of "active" tailings and 765,033 tons of "inactive" residues.[80]

In August 1978, it was discovered that Anaconda, as a means of "holding down costs," had made massive use of tailings at Laguna as fill in its "improvement" of the reservation road network. At the same time, it was revealed that tailings had constituted the "sand and gravel mix" of concrete with which the corporation had—with much fanfare about the "civic benefits" it was thereby bestowing upon its indigenous "partners"—poured footings for a new tribal council building, community center, and housing complex.[81] All were seriously irradiated as a result, a matter which may well be playing into increasing rates of cancer and birth defects, even among the nonminer sectors of Laguna's population.*

Probably the worst single example of mill-related contamination occurred on July 16, 1979, at the United Nuclear plant in Church Rock, New Mexico, when a tailings dam gave way, releasing more than a hundred million gallons of highly radioactive water into the nearby Río Puerco.[82] About 1,700 Diné living downstream were immediately affected, as were their sheep and other livestock, all of whom depended on the river for drinking water.† Shortly thereafter, with spill-area cattle exhibiting unacceptably

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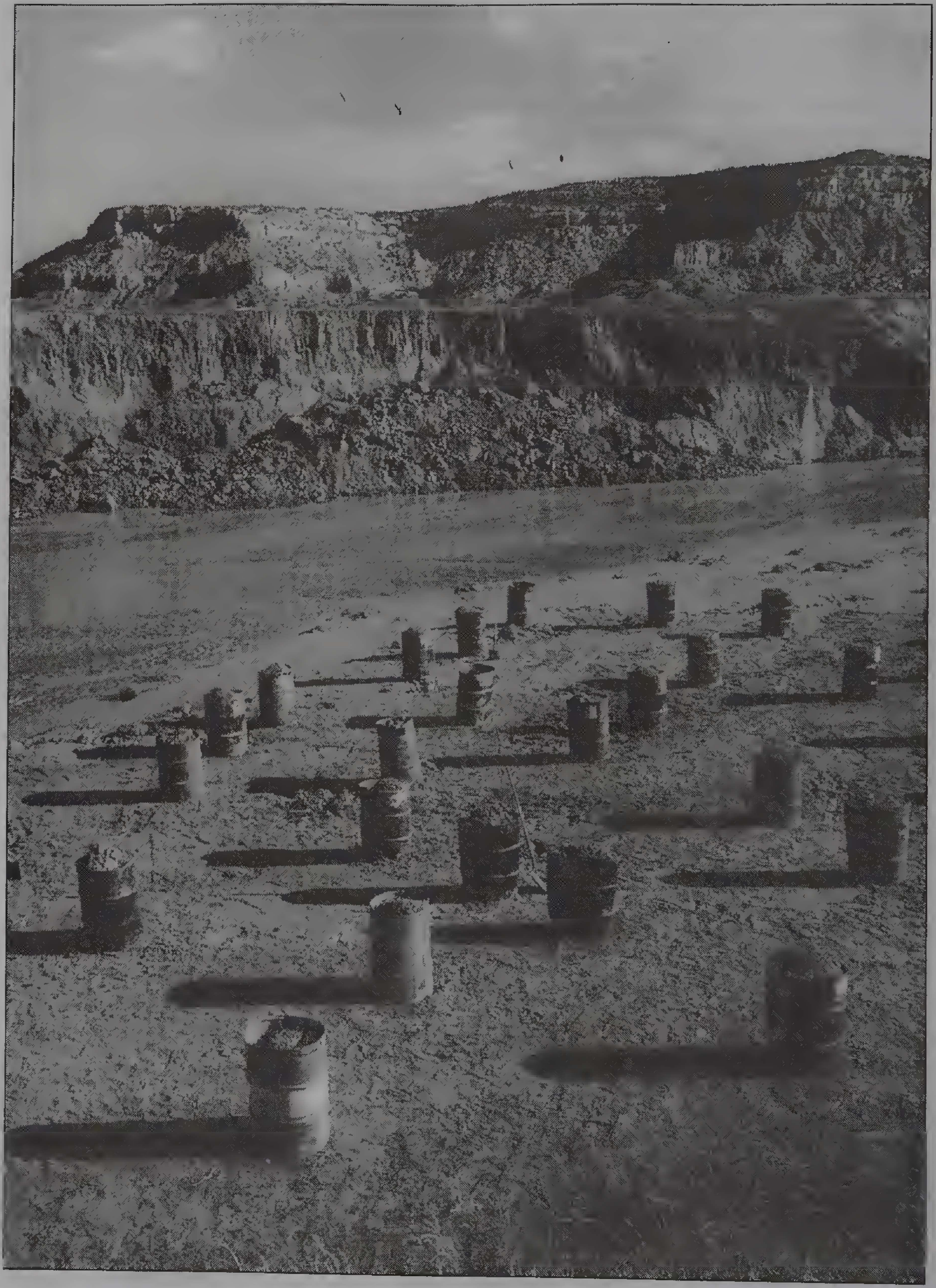
*E.g., in testimony given during 1986 hearings conducted in Denver with regard to the impact of Anaconda's operations around Laguna, Herman Garcia, a resident of the village of Paguate observed that among the nonminers of just that tiny community, in which there is no record of the disease prior to 1965, "last year...we lost five people from cancer... [T]hese people that I'm talking about were nondrinkers and nonsmokers...and I don't know how you'd figure that out"; *Environmental Impact Statement for the Jackpile-Paguate Uranium Mine Reclamation Project, op. cit.*, pp. A-62–3. During the same hearing, a radiation scientist employed by Anaconda testified, contrary to such direct evidence and without offering or being asked to identify the data upon which he based his conclusion, that "individual lifetime risk of cancer in the most exposed individuals at Paguate...is far less than the lifetime risk of dying due to excess cosmic rays received by living in Denver, Colorado." Nor was the good doctor asked to explain why, if this were in any way true, cancer is virtually unknown among populations—the Sherpas of the Himalayas, for instance—residing at elevations much higher than that of Denver; ibid., p. A-10.

†In the immediate aftermath, the Río Puerco was testing at over 100,000 picocuries of radioactivity per liter. The maximum "safe" limit is *fifteen* picocuries; Janet Siskind, "A Beautiful River That Turned Sour," *Mine Talk*, Summer/Fall 1982; Steve Hinschman, "Rebottling the Nuclear Genie," *High Country News*, Jan. 19, 1987. Although the July 16 "incident" was the seventh spill from this single dam in five years, United Nuclear had already applied for—and would receive—federal permission to resume use of its tailings pond within two months; Editors, "The Native American Connection," *Up Against the Wall Street Journal*, Oct. 29, 1979.



Cleanup of a nuclear uranium waste spill along the Río Puerco, on the Navajo Nation, 1979. Photo: Don Budnick.

high levels of lead-210, polonium-210, thorium-230, radium-236, and similar substances in their tissues, all commercial sales of meat from such animals was indefinitely prohibited.[83]

Even as the ban went into effect, Indian Health Services Area Director William Moehler—rather than calling for allocation of federal funds with which to provide emergency rations to those most directly at risk—approved consumption of the very same mutton and beef by local Diné.[84] At about the same time, a request by downstream Diné for United Nuclear to provide them with trucked-in water, at least in quantities sufficient to meet the immediate needs of the afflicted human population, was met with flat refusal.* The corporation stonewalled for another five years—until it was revealed by the Southwest Research and Information Center, an Albuquerque-based environmental organization, that it had known about cracks in the dam at least two months before it broke and had failed to repair it—before agreeing to a minimal, state-facilitated "settlement" of $525,000.[85]

By and large, however, it was not outright disasters such as the Church Rock spill, but the huge and rapidly proliferating accumulation of mill tailings throughout the Four Corners region—more than a half-billion tons in 200 locations by 1979, an amount projected to double by the end of the century—which provoked a team of Los Alamos experts, utterly at a loss as to what to do with such vast quantities of radioactive waste, to recommend the "zon[ing] of uranium mining and milling districts so as to forbid human habitation."[86] The idea dovetailed perfectly with the conclusions drawn in a contemporaneous study undertaken by the National Academy of Sciences (NAS), that desert lands subjected to stripmining can never be reclaimed.[87]

Since the Peabody Coal Company, among others, was/is engaged in ever more massive coal stripping operations on Navajo,[88] the logical outcome of the Los Alamos and NAS studies was formulation of a secret federal "policy option" declaring the Four Corners, and also the Black Hills region of the northern plains,* "national sacrifice areas in the interests of energy development."[89] Not coincidentally, the pair of locales selected contained the largest and second-largest concentrations of reservation-based Indians in North America: Navajo, with over 120,000 residents in 1980, is by far the biggest reservation both in size and in population in the United States. Also sacrificed in the Four Corners region would be—at a minimum—the Hopi, Zuni, Laguna, Acoma, Isleta, Ramah Navajo, Cañoncito Navajo, Ute Mountain, and Southern Ute reservations. The 50,000 residents of the "Sioux Complex" of reservations in North and South Dakota—Pine Ridge, Rosebud, Crow Creek, Cheyenne River, and Standing Rock in particular—make up the second most substantial concentration. Also sacrificed in the Black Hills region would be the Crow and Northern Cheyenne reservations in Montana, and possibly the Wind River Reservation in Wyoming.[90]

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* One company spokesperson reportedly informed community representatives that, "This is not a free lunch"; quoted in Dan Liefgree, "Church Rock Chapter Upset at UNC," *Navajo Times*, May 8, 1980. Such behavior is neither unique nor restricted to corporations. When, in 1979, it was discovered that well water in the Red Shirt Table area of the Pine Ridge Reservation in South Dakota was irradiated at a level fourteen times the EPA maximum—apparently as the result of the 3.5 million tons of tailings produced by an isolated AEC mining/milling operation begun in 1954 at Igloo, a nearby army ordnance depot—Tribal President Stanley Looking Elk requested $200,000 in BIA emergency funding to supply potable water to local Oglala Lakota residents. The Bureau approved Looking Elk's request in the amount of $175,000, but stipulated that the water be used *only for cattle*; Madonna Gilbert, "Radioactive Water Contamination on the Redshirt Table, Pine Ridge Reservation, South Dakota" (Porcupine, SD: WARN Reports, Mar. 1980); Women of All Red Nations, "Radiation: Dangerous to Pine Ridge Women" *Akwesasne Notes*, Spring 1980; Patricia J. Winthrop and J. Rothblat, "Radiation Pollution in the Environment," *Bulletin of Atomic Scientists*, Sept. 1981, esp. p. 18.

As American Indian Movement leader Russell Means would observe in 1980, shortly after existence of the plan had been disclosed, to sacrifice the landbase of landbased peoples is tantamount to sacrificing the peoples themselves, a prospect he aptly described as genocide while calling for appropriate modes of resistance.[91]

Although a policy of deliberately creating national sacrifice areas out of American Indian reservations was never formally implemented, the indirect effect may well be the same. With windblown tailings spread over wide tracts of Navajo, ground and surface water alike contaminated with all manner of radioactive substances, and Diné children literally using abandoned mounds of tailings as sand piles, it is not unreasonable to suspect that both the land and the people have already been sacrificed on the altar of U.S. Cold War

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*Although little uranium mining or milling had occurred in this region (with the exception of that at Igloo, which ended in 1972, it contains substantial deposits of uranium, low-sulphur coal, and a wealth of other minerals. As was noted by one contemporaneous observer, overall, "the plans for the hills are staggering. They include a giant energy park featuring more than a score of 10,000 megawatt coal-fired plants, a dozen nuclear reactors, huge coal slurry pipelines designed to use millions of gallons of water to move crushed coal thousands of miles, and at least fourteen major uranium mines"; Harvey Wasserman, "The Sioux's Last Fight for the Black Hills," *Rocky Mountain News*, Aug. 24, 1980. Also see Amelia Irvin, "Energy Development and the Effects of Mining on the Lakota Nation," *Journal of Ethnic Studies*, Vol. 10, No. 2, Spring 1982.

arms development.* If so, they and their counterparts at Laguna, Acoma, and elsewhere will have become victims of what may be, to date, history's subtlest form of physical extermination.†

Weapons Research and Production

The Los Alamos lab might well have extended its zoning recommendations to include not just uranium mining and milling districts but localities in which nuclear weapons research and production have been carried out, beginning with itself. Here again, although the sites at which yellowcake is enriched and/or transformed into plutonium have been scattered across the country in localities not typically associated with indigenous people, the great weight of contamination in this connection has been off-loaded by the dominant society onto Indian Country.‡

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* All told, the official count is "approximately 1,000 significant nuclear waste sites" on Navajo alone; U.S. Department of Interior, Environmental Protection Agency, *Potential Health and Environmental Hazards of Nuclear Mine Wastes* (Washington, D.C.: U.S. Government Printing Office, 1983) pp. 1–23. During the aforementioned April 12, 1980, National Citizens' Hearings on Radiation Victims in Washington, D.C., former uranium miner Kee Begay, dying of lung cancer, testified that he had "lost a son, in 1961. He was one of the many children that used to play in the uranium piles during those years. We had a lot of uranium piles near our homes—just about fifty or a hundred feet away or so—a lot of tailings. Can you imagine? Kids go out and play on those piles!"; quoted in Freeman, *Nuclear Witnesses, op. cit.*, pp. 143–4. Haunting sequences of Diné children playing during the late 1970s in abandoned United Nuclear tailings piles in the reservation community of Tuba City, Arizona, are included in a film by Christopher McCleod, *Four Corners: A National Sacrifice Area?* (San Francisco: Earth Image Films, 1981). Although most of the larger piles have now been fenced off and warning signs posted, there is absolutely no reason to assume kids aren't still playing "king of the mountain" on them from time to time, and suffering the longterm consequences. Besides, radon gas has seldom been known to respect the constraints of a chain-link fence.

† While Grants Belt mining and milling accounted for all but about 10 percent of U.S. uranium production between 1941 and 1982, small amounts were done elsewhere in Indian Country. The AEC facility at Igloo has already been mentioned. Other examples include the Dawn Mining Company's mine and mill which operated at Blue Creek, on the Spokane Reservation in Washington State, from 1964 to 1982, and Western Nuclear's Sherwood facility in the same locale, which operated briefly, from 1978 to 1982. The Blue Creek site in particular has generated contamination of local groundwater at levels forty times the EPA's maximum permissable limit for human consumption (4,000 times the area's natural level); Ambler, *Breaking the Iron Bonds, op. cit.*, p. 176. Another illustration is the Susquehannah-Western Riverton mill site on the Wind River Reservation in Wyoming. Although it ceased operation in 1967, the corporation followed the usual practice of simply walking off and leaving the results for the local Indians, in this case Shoshonis and Arapahos, to deal with; Marjane Ambler, "Wyoming to Study Tailings Issue," *Denver Post*, Feb. 5, 1984; U.S. Department of Energy, *Environmental Assessment on Remedial Action at the Riverton Uranium Mill Tailings Site, Riverton, Wyoming* (Albuquerque: DOE Western Regional Office, June 1987).

‡ The plants in which yellowcake—uranium-238—is enriched to reactor/weapons grade U-235 are the largest and most costly industrial facilities of any kind in the world. Only a handful exist: one each in Britain, France, and China, two in the former Soviet Union, and three in the United States. The U.S. plants are those run by Union Carbide at Oak Ridge, Tennessee and Paduchah, Kentucky, and

The extent of radioactive contamination at Los Alamos, which consists, as was noted above, of land "withdrawn" from the San Ildefonso Reservation in 1942, is astonishing. A half-century of nuclear weapons research on the 43-square-mile "campus"—which adjoins not only San Ildefonso, but the Santa Clara, San Juan, Jemez, and Zia reservations—has produced some 2,400 irradiated pollution sites.[92] A single 1950 experiment in which "simulated nuclear devices" were exploded in order to track radioactive fallout patterns was not only kept secret for decades, but left strontium residues in nearby Bayo Canyon which remain clearly detectable more than forty years later.[93] The facility also has a long history of secretly and illegally incinerating irradiated wastes—a practice producing significant atmospheric contamination—as was acknowledged by the EPA in 1991.[94]

The greatest concentration of hazardous materials in the Los Alamos compound is situated in what is called "Area G," which "began taking radioactive waste in 1957. Since 1971, 381,000 cubic feet of [lab]-generated transuranic [plutonium-contaminated] waste has been stored there; no one knows how much went in before 1971, since records are scanty. Wastes were interred without liners or caps, in bulldozed pits" from which they may be presumed to be leaking.[95] This, in combination with the lab's chronic release of radioactive substances into the atmosphere is thought to be correlated to dramatic increases in cancers and birth defects among local native populations over the past twenty years.[96] Plutonium contamination of surface water has been found downstream at least as far as the Cochiti Reservation, thirty miles away.[97]

At present, with a general reorganization/consolidation of U.S. nuclear weapons research and production attending the end of the Cold War—such extraordinarily contaminated sites as Rocky Flats and Hanford have been shut down, and it has been officially suggested that the Lawrence

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that run by Goodyear Atomic at Portsmouth, Ohio; McKinley C. Olson, *Unacceptable Risk: The Nuclear Power Controversy* (New York: Bantam, 1976) p. 149. Plutonium-239, which requires a breeder reactor for production, was synthesized at the now-closed-off reservation Savannah River facility at Aiken, South Carolina, as well as the also defunct but reservation-abutting Hanford complex in the state of Washington. As concerns the use of plutonium in "civilian" applications like manufacturing reactor fuel rods, "in the early 1970s, there were four companies making [them]: Nuclear Fuel Service, Inc., Nuclear Materials and Engineering Corp. (NUMEC), Gulf United Nuclear Fuels, and the Kerr-McGee Corp. Three of the four plants are now shut down. Gulf United in Long Island quit business after a 1972 fire and explosion killed one worker and contaminated two others.
At Kerr-McGee's Cimarron, Oklahoma plant, 73 workers were contaminated with plutonim during a four-year period... The plant was shut down in December 1975. At present, only the NUMEC plant near Pittsburg is functioning"; Gyorgy, et al., *No Nukes, op. cit.*, p. 49.

Livermore labs follow suit—Los Alamos has been slated to assume an even more prominent role.[98] In the new plan, strongly opposed by area Indians, Area G is also slated for considerable expansion, becoming "a major dumping ground and waste treatment facility for the entire nuclear weapons complex."[99]

About sixty miles as the crow flies south-southwest of Area G, sandwiched between Albuquerque on the north and the Isleta Reservation to its south, is a large fenced-off compound within the Kirtland Air Force Base. This is the home of the Sandia National Scientific Laboratories, a facility second in importance only to Los Alamos in terms of U.S. nuclear weapons research.

> The civilian scientists, engineers, and technicians at Sandia are mostly responsible for the "weaponization" of nuclear bombs which means they "design all the 'peripheral parts and components' that detonate a warhead, and they figure out how to put the guts into delivery packages'—bodies that can be dropped, shot through the water, or whatever the military orders."[100]

Because Kirtland itself has long functioned as the "largest single storage-site for nuclear weapons in the world," maintaining an inventory of over one thousand devices in a vault hollowed out of Manzano Mountain, it is difficult to establish with precision which pollutants accrue from the base and which come from the lab.[101] What *is* known with certainty is that the Río Grande, which flows along the western boundary of the Kirtland/Sandia complex and provides surface water to Isleta, is contaminated with plutonium and a range of other radioactive substances.[102] In 1991, Sandia entered a request—more by way of a notification—to the City of Albuquerque that it wished to increase the "amounts and types" of such materials it was already dumping through municipal sewers into the Río Grande.[103]

A similar though far more extravagant example is that of the Hanford nuclear weapons research and manufacturing facility, a sprawling tract adjoining the town of Richland, about thirty miles upwind/upstream from the Yakima Reservation in western Washington. Opened by the military in 1944, and subsequently operated by the AEC/DOE until its closure in mid-1990, Hanford possessed one of the two U.S. breeder reactors producing plutonium for weapons manufacture.[104] Despite frequent official denials that it presented any sort of public health hazard during the span of its operation, the complex exhibits an unparalleled record of deliberate environmental contamination, beginning with a secret experimental release of radioactive iodides in 1945, the first of a long series, which equaled or surpassed the total quantity of pollutants emitted during the disastrous 1986 Soviet reactor meltdown at Chernobyl.*

Also in 1945, Hanford officials secretly instructed staff to begin "disposing" of irradiated effluents by the simple expedient of pouring them into unlined "sumps" from which they leached into the underlying acquifer. All told, before the plant was closed something in excess of 440 *billion* gallons of water laced with everything from plutonium to tritium to ruthenium had been dumped in this "cost efficient" manner.[105] Another 900,000 gallons of even more highly radioactive fluids were stored in a 117–unit underground "tank farm" maintained under contract by ARCO, several components of which were found to be leaking badly. Not only has regional groundwater been severely contaminated, but wastes have been found to have passed into the nearby Columbia River in quantities sufficient to irradiate shellfish at the river's mouth, more than 200 miles distant.†

> Not only has the Hanford plant been discharging and leaking radiation into the river for forty-five years, but serious accidents have occurred at the reactors. One could perhaps excuse the accidental release of radiation [if not its cover-up], but on several occasions huge clouds of isotopes were created knowingly and willingly. In December [1952, to provide another example,] about 7,800 curies of radioactive iodine-131 were deliberately [and secretly] released in an experiment designed to detect military reac-

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*Blanche Wiesen Cook, "Cold War Fallout," *The Nation*, Dec. 9, 1996, p. 32. The Chernobyl explosion released, at a minimum, 185 million curies of atmospheric radiation during the first ten days. It has claimed 125,000 dead during the first decade, a rate which is not expected to peak for another ten years. That the 1945 Hanford release—one of seven such—did not claim a similar toll is owing to the fact that the facility is situated in a far less populated area; Alla Yaroshinka, *Chernobyl: The Forbidden Truth* (Lincoln: University of Nebraska Press, 1995). It should also be noted that the faulty helium-cooled graphite block employed at Chernobyl was itself lifted from a reactor constructed at Hanford; Amory B. Lovins and Hunter L. Lovins, *Brittle Power: Energy Strategy for National Security* (Andover, MA: Brickhouse, 1982) p. 197.

†There were at least eleven tank failures at Hanford by 1970. Another, reputedly the worst, was discovered on June 8, 1973. Tank 10-6T, a unit installed in 1944, was found to have corroded to the point that it had leaked some 115,000 gallons of high-level waste—containing about 40,000 curies of cesium 137, 14,000 curies of strontium 90, and four curies of plutonium 239—over a 51-day period. Overall, between August 1958 and June 1973 alone, it is estimated that 422,000 gallons of fluids containing more than a half-million curies of radioactivity leaked from the ARCO "farm" at Hanford; Robert Gillette, "Radiation Spill at Hanford: The Anatomy of an Accident," *Science*, No. 181, Aug. 1973. Also see Kenneth B. Noble, "The U.S. for Decades Let Uranium Leak at Weapons Plant," *New York Times*, Oct. 15, 1988; Martha Odom, "Tanks That Leak, Tanks That Explode... Tanks Alot DOE," *Portland Free Press*, May 1989. Concerning shellfish as an indicator of the extent the Columbia River has been contaminated, it should been noted that a Hanford worker who dined on oysters harvested near the river's mouth in 1962 reportedly ingested sufficient radioactivity in the process that he triggered the plant's radiation alarm upon returning to work; Caldicott, *If You Love This Planet, op. cit.*, p. 89.

> tors in the Soviet Union (only 15 to 24 curies of iodine-131 escaped at Three Mile Island in 1979).[106]

The true extent of the ecological holocaust perpetrated at and around Hanford is unknown, and is likely to remain so over the foreseeable future, given that most information about the facility is permanently sealed as a matter of "national security," and DOE/Pentagon/corporate officials claim to have "lost" much of what is supposedly accessible.[107] Such information as has come out, however, tends to speak for itself:

> Abnormally high incidence of thyroid tumors and cancers have been observed in populations living downstream from Hanford. People in adjacent neighborhoods [notably, the Yakimas and nearby Spokanes] were kept uninformed about [radioactive] releases—before, during and after—and none were warned that they were at risk for subsequent development of cancer. (Some experts have estimated that downwind farms and families received radiation doses ten times higher than those that reached Soviet people living near Chernobyl in 1986).*

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* Caldicott, *If You Love This Planet, op. cit.*, p. 90. The cancer correlation at Hanford has not been a mystery in official circles since at least as early as 1972, when an AEC-funded longitudinal study of 3,250 workers employed at the plant from 1944 onward revealed a marked increase in cancers of the lungs, pancreas, and bone marrow. Then, in an independent study conducted under auspices of the Washington State Health Department (WSHD) in 1974, "one of the things that popped out was too much cancer in Hanford workers." The AEC's response to this confirmation of its own findings was to ask the WSHD researcher, Dr. Sam Milham, Jr., *not* to publish his results; David Burnham, "Study of Atom Workers' Deaths Raises Questions About Radiation," *New York Times*, Oct. 25, 1976. When Milham released his data anyway—it was finalized as "Increased Cancer Mortality Among Male Employees of the Atomic Energy Commission Hanford, Washington Facility," in U.S. House of Representatives, Committee on Interstate and Foreign Commerce, Subcommittee on Health and Environment, *Effects of Radiation on Human Health, Vol. 1: Effects of Ionizing Radiation* (Washington, D.C.: 95th Cong., 2d Sess., U.S. Government Printing Office, 1978)— the commission tried to convince its own researcher, Dr. Thomas F. Mancuso, to publish a "strong rebuttal." When Mancuso in turn refused, he was removed from his position and, although he published an overview of his findings anyway—Thomas F. Mancuso, Alice Stewart, and George Kneale, "Radiation Exposures of Hanford Workers Dying of Various Causes," *Health Physics*, No. 33, 1977—his research materials were impounded as "government property"; William Hines, "Cancer Risk at Nuclear Plant? Government Hushes up Alarming Study," *Chicago Sun-Times*, Nov. 13, 1977. As to the spiraling incidence of thyroid cancer among downwinders exposed to massive atmospheric releases of radioactive iodides, the question—given that iodine collects in the thyroid—is the sort of no-brainer which might be adequately addressed by a high school biology student; John W. Gofman, "The Question of Radioactive Causation of Cancer in Hanford Workers," *Health Physics*, No. 37, 1979. Government researchers nonetheless profess to be stymied on the issue of whether there is a "tangible connection" between exposure and cancer; Keith Schneider, "Seeking Victims of Radiation Near Weapons Plant," *New York Times*, Oct. 17, 1988. Meanwhile, we are to believe that researchers can predict within a tenth of a percentage point how many U.S. cancer deaths next year will accrue from the inhalation of "secondhand" cigarette smoke. Indeed.

In sum, the probability is that Los Alamos, Sandia, Hanford, and their surrounding areas should be added to the extensive geographical sacrifices already discussed with respect to uranium mining and milling. To the extent that this is true—and it is almost certainly the case at Hanford—several more colonized indigenous nations must be added to the roster of those peoples whose sacrifice is deemed necessary, useful, or at least acceptable, in the interests of U.S. nuclear development. Nowhere is the intrinsic falsity of the myth that "pure" scientific research is somehow "neutral" or "detached" more conspicuously evident. In this instance at least, without the sacrifices in lands and lives there could be no "science" at all.

Weapons Testing

Nuclear weapons and their "delivery systems," once designed and constructed, must be tested. The first illustration of this principle at work was, of course, Trinity—not only the Alamagordo blast, but perhaps those at Hiroshima and Nagasaki as well—a set of experiences confirming in the minds of U.S. planners and strategists the need for vast tracts of "remote" and "worthless" territory for use in such activities.[108] Probably the most immediate result was an expansion of the original Alamagordo Bombing Range by something over a thousand percent, until by 1950 it had assumed its present 4,000-square-mile incarnation as the White Sands Test Range, a scale making it the largest single military-use parcel in North America and most likely the world.[109]

Although no atomic devices were detonated at White Sands after the original 1945 blast—the limited amount of U.S. postwar nuclear testing was conducted in one of America's newly acquired Pacific colonies, the Marshall Islands, a process which accelerated after 1950 and continued for another eight years*—the compound's expanse of desert terrain has been ravaged over the years by gigantic expenditures of other ordnance, much of it capable of packing a nuclear warhead.

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*The United States conducted a total of 106 nuclear tests in the Pacific between 1946 and 1958, 101 of them from 1950 onward. Two atolls in the Marshall Islands, Bikini and Enewetak—occupied by the United States in 1943—were subjected to 66 blasts of up to 15 megatons each, beginning in 1946. Among the tests conducted on Enewetak was that of the first hydrogen bomb in 1952. The local populations were forcibly relocated to Kili Island, where they were held against their will until 1968. The Bikinians were then told, falsely, that it was safe to return to their homes, which were saturated with the radiation of 23 bombs. A decade later, the Enewetakans were also encouraged to return to their homes, despite the fact that a 1979 General Accounting Office study concluded they would be exposed to dangerously high radiation levels accruing from the 43 tests conducted there

> White Sands is used for everything from full-scale battle practice with real jet planes and missiles powered by remote control from the basement of the "Range Control Center" to the development and testing of top secret lasers like Miracl (Mid-Infrared Advanced Chemical Laser), capable of hitting satellites. "White Sands averages more than twenty 'missions' a day"... Electronic warfare is played here, and the Patriot Missile was tested here, as well as "conventional" explosives that can simulate the blast of a nuclear explosion.[110]

The army's Nuclear Effects Directorate also maintains, in the southwest corner of White Sands, a 45x100 ft. "solar furnace" capable of duplicating, in "thermal bursts," the 3000° F. temperatures resulting from a nuclear detonation.[111] For the past quarter-century, a large area within the test range has been devoted more or less exclusively to experimenting with various types of depleted uranium munitions, which has literally saturated its sandy surface with radioactive particles.[112] The Mescalero Apache Reservation, barely a dozen miles downwind at its closest point, has undoubtedly suffered the windblown contamination emanating from White Sands over the years, although the effects are presently unknown.[113]

While it was determined (on the basis of criteria which remain classified) that it would be inappropriate to engage in more extensive nuclear weapons testing at White Sands, the search for a more suitable continental locale began as early as 1948.* Two years later, the AEC/Pentagon combo finally settled on an existing tract in the upper Sonoran desert region of Nevada, an area which it had already decided "really wasn't much good for anything but gunnery practice—you could bomb it into oblivion and never notice the difference."[114]

> On October 29, 1940, President Roosevelt established the Las Vegas [Tonopah] Bombing and Gunnery Range. Now called the Nellis Range it is the largest military

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prior to 1958; Giff Johnson, "Nuclear Legacy: Islands Laid Waste," *Oceans*, January 1980. The Bikinians were removed from their island again in 1978—at about the same time the people of Enewetak were going home—because cancers, birth defects, and other maladies had become endemic. It is likely that they had been returned in the first place to serve as a test group upon which the effects of plutonium ingestion could be observed; Giff Johnson, "Bikinians Facing Radiation Horrors Once More," *Micronesia Support Committee Bulletin*, May-June 1978. Quite probably, the Enewetakans were slated to serve the same purpose.

*Although various interesting possibilities for a test site were apparently considered—including Cape Hatteras/Cape Fear area of the North Carolina coast—the three real contenders were all in the southwestern desert regions: White Sands-Alamagordo, the Las Vegas-Tonopah Bombing and Gunnery Range, and another portion of Nevada, "about fifty miles wide, extending from Fallon to Eureka"; Robbins, Makhijani, and Yih, *Radioactive Heaven, op. cit.*, p. 55.

> range in the Western world [*sic*: standing alone, White Sands is larger]. Executive order 8578 established the range under an obscure legal authority [that] provided for allowing the president to reserve unappropriated public domain lands for aviation fields for testing and experimental work... The original executive order reserved 3.5 million acres on the range.[115]

Of course, nobody bothered to ask the Newe (Western Shoshone) people, within whose treaty-guaranteed territory the entire facility was established, whether they felt this was an acceptable use of their land, or whether they were even willing to have it designated as part of the U.S. "public domain" for *any* purpose.[116] Instead, in 1952, having designated 435,000 acres in the Yucca Flats area of Nellis as a "Nevada Test Site"—another 318,000 acres were added in 1961, bringing the total to 753,000—the AEC and its military partners undertook the first of what by now add up to nearly a thousand atmospheric and underground test detonations.* In the process, it converted the peaceful and pastoral Newes, who had never engaged in an armed conflict with the United States, into "the most bombed nation on earth."[117]

> The deadly atomic sunburst over Hiroshima, in 1945, produced 13 kilotons of murderous heat and radioactive fallout. At least 27 of the 96 above-ground bombs detonated between 1951 and 1958 at the Nevada Test Site produced a total of over 620 kilotons of radioactive debris that fell on downwinders. The radioactive isotopes mixed with the scooped-up rocks and earth of the southwestern desert lands and "lay down a swath of radioactive fallout" over Utah, Arizona, and Nevada. In light of the fact that scientific research has now confirmed that *any* radiation exposure is danger-

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*On acreage, see Loomis, *Combat Zoning, op. cit.*, p. 31. With respect to the number of test detonations—five of which actually occurred north of the test site, on the Nellis bombing range—the official count was 702 U.S. and 23 British as of early 1992; U.S. Department of Energy, *Announced United States Nuclear Tests July 1945 through December 1991* (Washington, D.C.: U.S. Government Printing Office, 1992). On December 8, 1992, however, the *New York Times* reported that there had been 204 *unannounced* U.S. tests conducted at the Nevada facilty between 1952 and 1990. Adding in the six tests approved by the Clinton administration during 1992, we arrive at an actual total of 953 nuclear bombings of Newe territory by that point (there have been at least a dozen more, since). All told, leaving aside U.S.-British joint tests and detonations carried out as part of "Operation Plowshare" during the 1960s (see notes 126–9, below), but adding in its own testing programs in New Mexico and the Pacific Basin, the United States can be seen to have exploded, at a minimum, 1,018 nuclear devices during the Cold War. By comparison, the U.S.S.R. is known to have triggered 713 detonations—including 115 designated as being for "civilian purposes," comparable to Plowshare—during the same period. Soviet military testing, of course, included a 58–megaton atmospheric blast—about four times larger than "Bravo 1," the largest U.S. counterpart—at Novaya Zemlya in 1961; Robbins, Makhijani, and Yih, *Radioactive Heaven, op. cit.*, p. 91.

> ous, the "virtual inhabitants" (more than 100,000 people) residing in the small towns east and south of the test site were placed in...jeopardy by the AEC atomic test program (emphasis added).*

To be sure, those most affected by the estimated 12 billion curies of radioactivity released into the atmosphere over the past forty-five years have been the native communities scattered along the periphery of Nellis.[118] These include not only three Newe reservations—Duckwater, Yomba, and Timbisha—but the Las Vegas Paiute Colony and the Pahrump Paiute, Goshute, and Moapa reservations as well. Their circumstances have been greatly compounded by the approximately 900 underground test detonations which have, in a region where surface water sources are all but nonexistent, resulted in contamination of groundwater with plutonium, tritium, and other radioactive substances at levels up to 3,000 times maximum "safe" limits.[119]

Although the government has been steadfast in its refusal to conduct relevant epidemiology studies in Nevada, especially with respect to indigenous peoples, it has been credibly estimated that several hundred people had already died of radiation-induced cancers by 1981.† The situation concerning birth defects and infant mortality in the area has also been kept deliberately murky, although the hideous aftermath of U.S. testing in the Marshall Islands may give hints as to what can be expected (or may already have occurred in some iso-

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*Howard Ball, *Justice Downwind: America's Atomic Testing Program in the 1950s* (New York: Oxford University Press, 1986) p. 85. A 1956 effort by concerned downwinders to legally enjoin the AEC from testing was defeated by a barrage of testimony and other evidence submitted by government officials and "scientific experts," all of them insisting upon the "truth" that the tests presented "no public health hazard." Although these witnesses were later proven to have lied under oath—that is, they committed perjury in a manner constituting a "reckless disregard for human life," both of which are crimes in the United States—no legal action was ever taken against them; Kulentz, *Geographies of Sacrifice, op. cit.*, p. 99; Randall Smith, "Charge Ike Misled Public on N-Tests," *New York Daily News*, Apr. 20, 1979; Richard D. Lyons, "Public Fears Over Nuclear Hazards Are Increasing," *New York Times*, July 1, 1979. Also see Richard Miller, *Under the Cloud: The Decades of Nuclear Testing* (New York: Free Press, 1986).

†"Report: Feds Snub Tribe's Radiation Exposure," *Reno Gazette-Journal*, June 7, 1994. On estimate of deaths, see James W. Hulse, *Forty Years in the Wilderness* (Reno: University of Nevada Press, 1986) p. 61. Ironically, it appears that one such fatality may have been the hyperpatriotic actor John Wayne—a staunch advocate of U.S. nuclear supremacy—who was heavily irradiated by fallout from a test detonation while filming the movie *The Conqueror* in the Nevada desert during 1956. He, his costars, and most of the film crew later died of cancer; Karen G. Jackovitch and Mark Sennet, "The Children of John Wayne, Susan Hayward and Dick Powell Fear That Fallout Killed Their Parents," *People*, Nov. 10, 1980. Also see Patrick Huyghe and David Konigsberg, "The Grim Legacy of Nuclear Testing," *New York Times Magazine*, Apr. 22, 1979; Anne Fadiman, "The Downwind People: A Thousand Americans Sue for Damage Brought on by Atomic Fallout," *Life*, June 1980.

lated desert communities).* Certainly, none of these effects could have been surprising or mysterious to federal officials, even in the 1950s and '60s, given that the data predicting them had been available to the AEC—and systematically suppressed—since 1947, *years* before massive weapons testing was begun.†

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* The reference here is to the residents of Rongelap and Utirik atolls. On March 1, 1954, a tremendous cloud of fallout from "Bravo 1," the detonation of a 15-megation hydrogen device on Bikini, 100 miles distant, saturated these unfortunates with fallout. They were left in place for nearly three days before they were evacuated, and were returned to their islands less than three years later despite the fact that radiation levels were known to still be extremely high; Aldridge, *Nuclear Empire, op. cit.*, pp. 23–8. The U.S. military has always contended that the incredible degree of contamination they suffered was an accident, resulting in an unexpected shift in the prevailing winds. In 1981, however, it was revealed by two meteorologists who were "on station" at the time that Bravo 1 had been conducted in full knowledge of wind conditions. It thus seems probable that the residents of Utirik and Rongelap were deliberately exposed in order that the effects of heavy fallout on humans might be studied; Giff Johnson, "Nuclear Clouds Over the Marshalls," *Glimpse*, Vol. 21, No. 4, 1981; "Another Nuclear Cover-Up," *Micronesia Support Committee Bulletin*, Vol. 6, No. 2, Summer 1981. Dr. Merril Eisenbud, who was director of the AEC Health and Safety Laboratory in 1941, and who was also part of the commission's Bravo Test Task Force, has also said as much; quoted in Henry Kohn, *Rongelap Assessment Project Report* (Berkeley: Rongelap Assement Project, University of California, 1989) p. 54. Moreover, in a January 1956 internal document, a member of the AEC's Advisory Committee on Biology and Medicine noted that Rongelap in particular provided a unique opportunity to study the long-term effects of radiation exposure since it "is by far one of the most contaminated areas in the world" and while "it is true that these people do not live...the way Westerners do, civilized people, it is nevertheless true that they are more like us than mice"; Robbins, Makhijani, and Yih, *Radioactive Heaven, op. cit.*, pp. 81–2. Beginning in 1962, thyroid nodules were detected in increasing numbers of Rongelapi and—19 of 22 exposed children required surgery—a total exceeding 50 percent by the 1980s. Thyroid cancer was slower in making its appearance on Utirik, which had been somewhat less exposed, but was spiraling there as well by the late 1970s. Rates of stillbirth and miscarriage also went up on both atolls by a factor of more than 300 percent. Finally, birth defects of the most acute sort—including eyeless, limbless fetuses similar to those evident among Japanese survivors of the Hiroshima and Nagasaki bombings—had made their appearance, especially on Rongelap; J.W. Hollingsworth, "Delayed Effects on Survivors of the Atomic Bombings: A Summary of the Findings of the Atomic Bomb Casualty Commission, 1947–1950," *New England Journal of Medicine*, No. 263, Sept. 1960; Bernard Franke, *Is Rongelap Atoll Safe?* (Takoma Park, MD: Institute for Energy and Environmental Research, 1989). In August 1983, the Congress of the Republic of the Marshall Islands passed a unanimous resolution requesting that the United States relocate the afflicted population. The DOE replied—contrary to all evidence, and its own maps—that the atoll was "safe for human habitation." In the end, it fell to Greenpeace, an international environmental organization, to honor the islanders' pleas by removing some 320 people from Rongelap in 1985; Robbins, Makhijani and Yih, *Radioactive Heaven, op. cit.*, p. 83. Clearly, the attitudes of the U.S. personnel involved in all this—military, bureaucratic, and scientific—exemplified those described by Robert Jay Lifton and Eric Markusen in their penetrating study, *The Genocidal Mentality: Nazi Holocaust and Nuclear Threat* (New York: Basic Books, 1988).

† See generally, Bill Curry, "A-Test Officials Feared Outcry After Health Study," *Washington Post*, Apr. 14, 1979. The mutogenic effects of strontium-90, a major ingredient of fallout, was studied intensively at the Argonne National Laboratory during 1945 and '46. A preliminary report was submitted to the AEC in 1947, a final in 1948. The results were not made "public," until 1969, and then only in an obscure scientific publication; Miriam P. Finkle and Birute O. Briskis, "Pathologic Consequences of Radiostrontium Administered to Fetal and Infant Dogs," in Melvin R. Sikov and D. Dennis Mahlum,

Rather than admit to any aspect of what it was doing, the military simply gobbled up increasingly gigantic chunks of Newe land, pushing everyone off and creating ever-larger "security areas" that rendered its activities less and less susceptible to any sort of genuine public scrutiny. "Military ranges in Nevada alone amount to four million acres. Approximately 40 percent of Nevada's airspace is designated for military use."[120]

Across the state line in California—it is separated from the gargantuan sprawl of military facilities in Nevada only by the width of the interposed

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eds., *Radiation Biology of the Fetal and Juvenile Mammal: Proceedings of the Ninth Annual Hanford Biology Symposium at Richland, Washington, 5–8 May 1969* (Springfield, VA: Clearinghouse for Federal Scientific and Technical Information, 1969). Meanwhile, despite its own mounting evidence, the groundbreaking work of Dr. Ernest J. Sternglass—demontrating strong correlations between *any* prenatal radiation exposure and increased rates of miscarriage, stillbirth, childhood leukemia, and other cancers (Sternglass estimated a radiation-induced increase in U.S. infant mortality of 400,000 by 1969)—was publicly assailed as "unproven" and "irresponsible" by the AEC; see, e.g., Ernest J. Sternglass, "Cancer: Relation of Prenatal Radiation to Development of the Disease in Childhood," *Science*, June 7, 1963; "Infant Mortality and Nuclear Tests," *Bulletin of Atomic Scientists*, Apr. 1969; "Can the Infants Survive?" *Bulletin of Atomic Scientists*, June 1969; "The Death of All Children," *Esquire*, Sept. 1969; *Low Level Radiation* (New York: Ballantine, 1972). At about the same time, the AEC set about discrediting the work of Dr. John Gofman, the University of California scientist who discovered both uranium-233 (synthesized from thorium) and the process by which plutonium can be isolated. Gofman's "mistake" was that, as a senior scientist at the Lawrence Livermore Labs during the late 1960s, he had concluded that there is no acceptable level of exposure to radiactive substances, that any exposure results in increased cancer rates, and that the AEC's "safe" limits were therefore invalid; see, e.g., John W. Gofman, "Federal Radiation Council Guidelines for Radiation Exposure of the Population at Large—Protection or Disaster?" in U.S. Congress, Joint Committee on Atomic Energy, *Environmental Effects of Producing Electric Power* (Washington, D.C.: 91st Cong., 1st Sess., U.S. Government Printing Office, 1969); John W. Gofman and Arthur R. Tamplin, "Epidemiologic Studies of Carcingogenesis by Ionizing Radiation," in J. Neyman, ed., *Proceedings of the Sixth Berkeley Symposium on Mathematical Statistics and Probability* (Berkeley: University of California Press, 1971). Gofman's AEC research funding was quickly revoked—this was just before Mancuso's was revoked at Hanford—and the National Cancer Institute (NCI) declined to replace it, a matter which effectively drove him from the field of epidemiology research. Another such casualty was Dr. Rosalie Bertell, an independent medical researcher who conducted studies on the basis of NCI funding until she began in the mid-'70s to publish results showing correlations between radiation exposure, leukemia, and other cancers confirming the findings of Sternglass, Gofman, Mancuso, and others; see, e.g., Rosalie Bertell, "Nuclear Suicide," *America*, No. 131, 1974; "More About Nuclear Suicide," *Nuclear Opponents*, May-June 1975; "Radiation Exposure and Human Species Survival," in Committee on Federal Research into the Biological Effects of Ionizing Radiation, *Issue Papers: Working Documents of 10 March 1980 Public Meeting* (Bethesda, MD: National Institutes of Health, 1980). At that point, NCI suddenly declined to renew her grants, explaining that if she would "like to change [her] line of research" it "would be happy to consider" a new proposal; quoted in Freeman, *Nuclear Witnesses, op. cit.*, p. 43. A common thread running through all of this seems to be Dr. Sidney Marks, a member of the pronuclear Energy Research and Development Association (ERDA) and highly paid "scientist-consultant" to the AEC as well as Union Carbide and other corporations, whose specialization seems to have been to invent pretexts upon which to challenge the validity of the conclusions reached by legitimate researchers like Mancuso and Bertell; *The Effect of Radiation on Human Health*, *op. cit.*, pp. 72, 714–27, 964–5.

Death Valley National Monument—lies the million-acre China Lake Naval Weapons Center.[121] Butted up against the Army's estate at Fort Irwin (one million acres), and close to both Edwards Air Force Base (500,000 acres) and the Marine Corps Base at Twentynine Palms (800,000 acres), China Lake uses its share of the Mojave Desert in the same manner as White Sands, only more so.[122] Established in November 1943 and expanded steadily thereafter, it was crediting itself by 1968 with being the location in which "over 75% of the airborne weapons of the free world [and] 40% of the world's conventional weapons" had been tested and perfected.[123] As in Nevada, local indigenous communities, both Newe and Paiute, have been pushed out while their lands, including sacred sites, have been bombed, strafed, and shelled relentlessly for more than fifty years.*

Probably the only "concession" made to native peoples in the region during this entire period has been that the three largest nuclear devices ever detonated underground, culminating in a monstrous 5-megaton blast in 1971, were exploded, not at the Nevada Test Site, but on Amchitka Island, off Alaska.† The reason for this change in procedure had nothing to do with concern for the well-being of humans, however. Rather, it was brought on by fears among AEC officials that the shock waves from such large blasts might cause serious damage to casinos and other expensive buildings in downtown Las Vegas, thereby provoking a backlash from segments of the regional "business community."[124] Hence, the brunt of the environmental/biological consequences wrought by the three biggest "bangs" was shifted

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*One such group of Timbisha Shoshones have more or less established themselves as "squatters" in a Death Valley visitor's center. Others are clustered to the north and west, in the Owens Valley, the Tehachapi Mountains, and the Lake Isabella area. One of their areas of particularly sacred geography, the Coso Range, is now "officially called the Military Target Range, [and] constitutes some 70 square miles of mountainous area...with various targets—bridges, tunnels, vehicles, SAM sites—emplaced in a natural forested environment for tactics development and pilot training under realistic conditions"; R.E. Kistler and R.M. Glen, *Notable Achievements of the Naval Weapons Center* (China Lake Naval Weapons Center: Technical Information Dept. Publishing Division, 1990) p. 17. For further details, see William Thomas, *Scorched Earth: The Military Assault on the Environment* (Philadelphia: New Society, 1995).

†Aside from the 1971 megablast—dubbed "Cannikan," it was about 350 times as powerful as the Hiroshima bomb, but carrying only one-third the force of the Bravo device exploded above ground on Bikini in 1954—the other two Amchitka detonations were Long Shot in 1965 (80 kilotons) and Milrow in 1969 (1 megaton); Robbins, Makhijani and Yih, *Radioactive Heaven, op. cit.*, p. 66; O'Neill, *Firecracker Boys, op. cit.*, pp. 112–5. The United States also engaged in "Operation Dominic," a series of 24 atmospheric tests conducted from April through July 1962, on Johnson Atoll (remotest point in the Hawaiian Archipelago) and British-controlled Christmas Island. The locations were selected to allow the Kennedy administration to avoid undue public outcry over its breach of a supposed moratorium on such tests; Robbins, Makhijani, and Yih, *Radioactive Heaven, op. cit.*, p. 124.

from the Indians of Nevada to the Aleuts, Inuits, and other peoples indigenous to the Aleutian Archipelago.[125]

AEC preoccupation with business sensibilities also led to one of the more bizarre propositions to emerge from the "Atoms for Peace" syndrome. This assumed the form of "Operation Plowshare" a grandiose scheme to detonate thousands of bombs underground, and more than a few in the atmosphere, for "commerial/strategic" purposes.[126] Ideas included a 1966 plan for using 315 megatons of nuclear explosives to cut a wider and deeper canal, either through Panama or the adjoining portion of Colombia—six years and $17 million were spent trying to figure out which was preferable—and the 1967–68 "Project Ketch," in which it was calculated that the use of something over a thousand devices would be sufficient to create a "national storage vault" beneath central Pennsylvania.[127]

Several subsurface blasts, designed to free up natural gas deposits while carving out huge underground vaults in which to store it, actually occurred. The first of a projected 40,000 such detonations, "Project Gasbuggy," was carried out on December 10, 1967, just outside the largely Diné community of Farmington, New Mexico.[128] What gas was released was "radioactive and unusable," and attempts to circumvent the problem resulted in substantial atmospheric contamination.[129] Nonetheless, the AEC followed up in 1969 with "Project Rulison," the simultaneous detonation of three buried devices near the town of Rifle, Colorado. Although the resulting trickle of gas was again too radioactive to use, the AEC went ahead, in 1974, with "Project Rio Blanco," exploding a 50-kiloton bomb about a mile below the nearby Grand River Valley. Failure this time was complete.[130]

The military value of such off-the-books testing must have been great, since during the same period the AEC, while spending some $138 million in tax dollars to produce an estimated $20–30 million in unusable gas for private oil corporations, also carried out similar exercises in the Carlsbad Caverns area of New Mexico, just east of the Mescalero Reservation, another outside the town of Fallon, Utah, another in an unpopulated area of central Nevada, and two more near the city of Hattiesburg, Mississippi.[131] It is likely that such operations would have continued indefinitely had not information concerning the accidental 1970 "venting" of "Banebury"—the small (10-kiloton) device was buried 271 meters deep but still ruptured the earth's surface and threw up a cloud of radioactive debris about three kilometers above the Nevada Test Site—produced enough frightened public reaction to force cancelation of the project.[132] Plainly, irradiating the entirety of Newe Segobia was one thing in the minds of American citizens; the prospect of allowing comparable contamination of New York or New Jersey was another.

Exactly how large an area has been sacrificed to nuclear testing and related activities is unclear, but it most certainly includes the bulk of southern Nevada and contiguous portions of California.[133] Indications are that it may encompass northern Nevada as well, given the insistence of Reagan-era Defense Secretary Caspar Weinberger—selected for this position, appropriately enough, on the basis of his credentials as a senior vice president of the Bechtel Corporation, the second-largest U.S. nuclear engineering contractor—that the rail-mounted MX missile system should be sited there, a move which would have effectively precluded human habitation.* Given prevailing wind patterns, the sacrifice area likely encompasses northwestern Arizona as well, including three indigenous nations—Hualapi, Havasupi and the Kaibab Reservation—located there.[134] Also at issue are the more westerly reaches of Utah, a region which includes the small Goshute and Skull Valley reservations in addition to another huge complex of military bases and proving grounds.†

Waste "Disposal"

Plutonium, an inevitable by-product of reactors and the essential ingredient in nearly all nuclear weapons, has been aptly described as being "the

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*Construction of the MX system—an entirely offensive weapon which was, of course, dubbed the "Peacekeeper"—promised to generate an estimated half-billion in profits for Weinberger's parent corporation; Tristan Coffin, "The MX: America's $100 Billion 'Edsel'," *Washington Spectator*, Oct. 15, 1980. It would also have eliminated the remaining habitable landbase of the Newe; Martha C. Knack, "MX Issues for Native American Communities," in Francis Hartigan, ed., *MX in Nevada: A Humanistic Perspective* (Reno: Nevada Humanities Press, 1980). As it is, the plan, and Newe resistance to it, brought to a head a long-festering conflict between indigenous people in northern Nevada who are continuing to use their land in traditional ways and federal bureaucrats who claim they are an "environmental hazard" which must therefore be removed; Kristine L. Foot, "*U.S. v. Dann*: What It Portends for Millions of Acres in the Western United States," *Public Land Law Review*, No. 5, 1984. Another fine study is to be found in Rececca Solnit's *Savage Dreams: A Journey Into the Hidden Wars of the American West* (San Francisco: Sierra Club, 1994).

†The latter include the 600,000-acre Hill Air Force Training Range, about 30 miles north of the somewhat larger Wendover Range. Adjoining Wendover to the south, is the equally sized Deseret Test Center (containing the Tooele Arms Depot), below which is a much smaller parcel, the Fish Springs Nuclear Weapons Range, where a 20-kiloton Plowshare device was exploded in 1970. Abutting both Wendover and Deseret to the east is another equally sized compound, the Dugway Proving Grounds. No public access is allowed on *any* of these approximately 2,750,000 acres, the combined controlled air space of which exceeds 20,000 square miles; see generally, Ostling and Miller, *Taking Stock, op. cit.*

most toxic substances in the universe."* Only ten micrograms, a microscopic quantity, is an amount "almost certain to induce cancer, and several grams...dispersed in a ventilation system, are enough to cause the death of thousands."[135] Indeed, it has been estimated that a single pound of plutonium, if evenly distributed throughout the earth's atmosphere, would be sufficient to kill every human being on the planet.† Viewed from this perspective, the quantity of this material created by the United States during the course of its arms race with the Soviet Union—as of 1989, the United States had amassed some 21,000 nuclear weapons—is virtually incomprehensible.[136]

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*Karl Grossman, *Cover Up: What You Are Not Supposed to Know About Nuclear Power* (New York: Permanent Press, 1980) p. 13. The substance does not exist in nature. Plutonium was created on December 2, 1942, when Enrico Fermi's team of Manhattan Project physicists working with an "atomic pile" at the University of Chicago produced the world's first controlled nuclear chain reaction. Subsequently, it was discovered—by future AEC Chairman Glenn T. Seaborg—that the material constituted an entirely new element resulting from the absorption of a fast neutron by a molecule of uranium-238 during the process of nuclear fission. This secondary fusion, it was found, is an inherent aspect of the fission (reaction). Hence, all nuclear reactors produce plutonium as a by-product intermixed with other waste material, although some—fast-breeder reactors such as those at Hanford and Savannah River, the proposed Clinch River facility at Oak Ridge, and the failed Fermi facility near Detroit—are actually designed to produce it in high volume. The reason for this is that plutonium is highly unstable and thus fissionable, making it an ideal material from which to produce both the "business end" of nuclear weapons and the cores of high-output reactors; see generally, David Dietz, *Atomic Science, Bombs and Power* (New York: Collier, 1962); Andrew W. Kramer, *Understanding Nuclear Reactors* (Barrington, IL: Technical, 1970). On commercial breeder reactors, see Creg Darby, "Beware the Fast Flux: Industry Is Readying a New Kind of Nuke," *The Progressive*, Sept. 1980. It should be noted here that "most toxic" status has also been asserted with regard to dioxin, a chemical synthetic commonly found in herbicides—notably Agent Orange and other defoliants used by the military in Vietnam—which is extraordinarily carcinogenic and mutogenic. It is another of those virulent substances in wide official/commercial use which sanctioned epidemiological studies have never been able to "conclusively" tie to the rampant cancers, birth defects, and other maladies incurred by those exposed to them; see, e.g., Fred Wilcox, *Waiting for an Army to Die: The Tragedy of Agent Orange* (New York: Random House, 1983).

†As Dr. Helen Caldicott explains, "When exposed to air, plutonium ignites, forming very fine particles—like talcum powder—that are completely invisible. A single one of these particles could give you lung cancer. Hypothetically, if you could take one pound of plutonium and could put a speck of it in the lungs of every human being [she estimates a single microgram is sufficient], you would kill every man, woman, and child on earth—not immediately, but later, from lung cancer"; Freeman, *Nuclear Witnesses, op. cit.*, p. 294. Additionally, "Plutonium is absorbed from the lungs into the blood stream where it can cause liver cancer. It is also taken up in the skeleton, producing bone cancer and leukemia. There is evidence that it collects in the [sex organs] at a concentration twice that of its point of entry into the lung. Infants are especially sensitive to the substance. In pregnant women, it also crosses the placenta into the embryo where it can kill developing cell walls and damage [or kill] the fetus"; Gyorgy, et al., *No Nukes, op. cit.*, p. 79. Also see David Burnham, "Rise in Cancer Death Rate Tied in Study to Plutonium," *New York Times*, June 6, 1976.

> By 1995, military weapons-grade plutonium, in the form of active and dismantled bombs, amounted to 270 metric *tons*. The commercial stockpile of plutonium in nuclear-reactor wastes and isoltes from spent fuel amounts to 930 metric tons and will double to 2,130 tons by 2005, only ten years from now. "Every four or five years we're [now] making about as much plutonium in the civil sector as we did during the whole Cold War." And this is only plutonium. Fission reactors create eighty radionuclides that are releasing "ionizing radiation," which causes harm to human beings in the form of genetic mutations, cancer, and birth defects.*

Leaving aside the proliferation of commercial reactors and other such facilities, as well as the mining and milling zones, there are 132 sites in thirty states where one or another facet of nuclear weapons production has left radioactive contamination.[137] The DOE currently estimates that it will cost about $500 billion to return these to habitable condition, an absurdly low figure when it is considered that the department admits elsewhere that neither concepts nor technologies presently exist with which even to begin cleaning up "large contaminated river systems like the Columbia, Clinch, and Savannah rivers, most groundwater [and] nuclear test areas on the Nevada Test Site."[138]

It is also conceded that there is no known method of actually "disposing" of—i.e., decontaminating—plutonium and other radioactive wastes after they've been cleaned from the broader environment.[139] Instead, such materials, once collected, can only be sealed under the dubious premise that they can be somehow safely stored for the next 250,000 years.[140] The sheer volume is staggering: "Hanford [alone] stores 8,200,000 cubic feet of high-level waste and 500,000 cubic feet of transuranic waste. Hanford buried

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* Kulentz, *Geographies of Sacrifice, op. cit.*, p. 109; quoting William J. Broad, "The Plutonium Predicament," *New York Times*, May 2, 1995. "There are several types of radiation [given off by these different substances]. *Gamma* radiation is a very high form of electromagnetic energy emitted by many radioactive substances including cesium-137 and iodine-131. It is extremely penetrating; gamma rays can travel hundreds of feet in the air and pass through anything except heavy lead shielding. X-rays are very similar to gamma rays except lower in energy. *Beta* radiation consists of very high energy electrons emitted by radioactive substances such as cesium-137 and iodine-131 as well as substances that emit gamma such as strontium-90. The beta particles are less penetrating than gamma or X-ray but produce more damage in a smaller space. *Alpha* radiation is emitted by radioactive substances such as plutonium-239 and uranium-235. Alpha particles are least penetrating and cannot pass through paper or human skin. It is important to realize, however, that the range of the particle is not the crucial factor once the radioactive substance has been ingested or inhaled since this brings the source of radiation into intimate contact with vulnerable tissue. For example, when substances which release alpha particles are taken into the body they intensely irradiate the cells in their immediate vicinity and are extremely carcinogenic"; Freeman, *Nuclear Witnesses, op. cit.*, p. 229. Also see John W. Gofman, *The Cancer Hazard from Inhaled Plutonium* (San Francisco: Committee for Nuclear Responsibility, May 14, 1975).

18,000,000 cubic feet of 'low-level' waste and 3,900,000 cubic feet of transuranic waste."[141] And, daunting as they are, these numbers—associated exclusively with weapons, weapons production, and commercial reactors—don't begin to include the millions of tons of accumulated mill tailings and similar by-products of "front end" nuclear processing.[142]

Such facilities as now exist to accomodate warhead and reactor wastes—at Hanford, Los Alamos, Rocky Flats, Idaho Falls, Oak Ridge, Savannah River, Paducah, New York's West Valley, and elsewhere—are all temporary installations designed to last a century or less, even under ideal sets of conditions (which seem never to prevail).* The steadily escalating rate of waste proliferation has led to the burning of plutonium and other substances—a practice which certainly reduces the bulk of the offending materials, but also risks sending clouds of radioactivity into the atmosphere†—and an increasingly urgent quest for safer interim facilities, called "monitored retrievable storage" (MRS) sites, and permanent "repositories" into which

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*All of the facilities have leaked, some for reasons which are simply unbelievable. At Rocky Flats, for example, plutonium-contaminated oil was kept by Dow Chemical in simple 55–gallon drums stacked in a "storage field" during the late 1960s. These corroded away, leaking their contents directly onto the ground. Eight *years* later, 440 cubic yards of dirt were finally dug up, sealed in better containers and transported by truck to the AEC/naval compound at Idaho Falls. There is a lengthy history of such incidents at the facilty; Marcia Klotz, et al., *Citizens' Guide to Rocky Flats: Colorado's Bomb Factory* (Boulder, CO: Rocky Mountain Peace Center, 1992). Small wonder area groundwater is badly contaminated with plutonium, or that breast cancer—not lung cancer, as might be conveniently associated with smoking—has appeared at epidemic rates among west side Denver women over the past two decades; Joan Lowry and Janet Day, "Flats Water Threat Cited," *Rocky Mountain News*, Dec. 7, 1988; Nicholas Lenssen, *Nuclear Waste: The Problem That Won't Go Away* (Washington, D.C.: Worldwatch Institute, 1991) pp. 34–5. It is worth noting that Dow was ultimately fined nothing for the incident in question.

†To use another example from Rocky Flats, on June 6, 1989, a task force of 75 FBI and EPA agents carried out "Operation Desert Glow," the only known "raid" of a military-related nuclear facility. Their purpose was to apprehend Rockwell International employees engaged in the large-scale, systematic, and thoroughly illegal disposal by fire of plutonium-contaminated waste materials. The FBI offered as evidence, among other things, infrared photographs showing nocturnal burnings occurring in a supposedly abandoned building which had been condemned for safety violations. The improperly filtered incinerator which was being used virtually guaranteed the contamination of downwinders on Denver's west side; Bartimus and McCartney, *Trinity's Children, op. cit.*, p. 194. Since Rocky Flats had already been phased out of weapons production, and federal publicists were feeling the need for a show of official"firmness," several corporate officials were actually indicted on this one. Second thoughts soon prevailed, however, since convictions might have an "undesirable chilling effect on the [nuclear] industry." A directed acquittal was entered over the vociferous objections of the grand jury (which then collectively sought to sue both judge and prosecutors). One reason for the government's sandbagging may have been that officials were already aware that they would soon be announcing burning, albeit in a marginally safer manner, as their own preferred "solution" to the plutonium problem; Becky O'Guin, "DOE: Nation to Burn and Vitrify Plutonium Stores," *Colorado Daily*, Dec. 10, 1996.

their contents could eventually be moved.[143] Here, as always, emphasis has been on off-loading the problem onto captive indigenous nations.[144]

The reason, predictably enough, is that despite a chorus of official assurances that neither an MRS nor a repository would present a health hazard, the precise opposite is true.* Dr. John Gofman, a truly pioneering bionuclear scientist, has calculated that if only 0.01 percent of the plutonium now in need of storage were to escape into the environment—a record of efficiency never remotely approximated by the nuclear establishment in either its public or private guise—up to 25 million people could be expected to die of resulting cancers over the following half-century.† Those most proximate to any dump site can of course expect to suffer the worst impact. Consequently,

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*The refrain, moreover, has been heard before. Consider the case of Edgemont, South Dakota, a community adjoining the Igloo Ordnance Depot, who were given such assurances in 1952 with respect to the uranium mining and milling then being started. Thirty years later, with epidemic cancer rates prevailing in the town for a generation, the DOE suddenly announced that the Edgemont area was so contaminated by mill tailings and other debris that it would be an ideal location for the siting of a high-level waste dump, to be run by the Chemical Nuclear Corporation. Official efforts to sell the plan included both a barrage of promises of significant revenues to "refuel" the depressed local economy and guarantees that the dump would constitute no health hazard for residents of the southern Black Hills region. Once burned, twice wary, the locals voted overwhelmingly to reject the overture; "Nuclear Waste Facility Proposed Near Edgemont," *Rapid City Journal*, Nov. 19, 1982; "Edgemont Waste Facility No Health Hazard Says Chem-Nuclear Corp.," *Rapid City Journal*, Dec. 10, 1982.

†"Plutonium is so hazardous that if you...manage to contain the [amounts projected to exist by the turn of the century] 99.99 percent perfectly, it would still cause somewhere between 140,000 and 500,000 extra lung-cancer fatalities each year... The point is, if you lose a little bit of it—a terribly little bit—you're going to contaminate the earth, and people are going to suffer for thousands of generations"; quoted in Freeman, *Nuclear Witnesses, op. cit.*, pp. 108, 111. With respect to industry efficiency in containing such materials, consider then-governor Nelson Rockefeller's state-of-the-art high-level West Valley Waste Storage Facility, run by the Nuclear Fuels Corporation, a Getty Oil subsidiary, and supposedly offering a perfect "leak-proof environment" for the next three centuries. It failed in just fourteen years, precipitating a 54-percent increase in infant mortality throughout surrounding Cattaraugus County, New York, in the process; Richard Severo, "Too Hot to Handle," *New York Times Magazine*, Apr. 10, 1977. Also consider the fact that, by 1977, the industry as a whole had "lost" some four *tons* of bomb-grade plutonium and uranium-235; David Burnham, "8,000 pounds of Atom Materials Unaccounted for by Plants in U.S.," *New York Times*, Aug. 5, 1977. The fact that part of this missing material may have been "stolen" by Israeli agents as part of that country's drive to develop its own nuclear weapons capacity is no cause for reassurance; Howard Kohn and Barbara Newman, "How Israel Got the Bomb," *Rolling Stone*, No. 253, Jan. 12, 1977; David Burnham, "House Aid Tells of Suspicion U.S. Uranium Was Stolen 10 Years Ago," *New York Times*, Aug. 9, 1977. Interestingly, no "Atom Spy Scare," à la the Rosenberg case, resulted from this bona fide espionage by "agents of a foreign power." Instead, President Lyndon Johnson ordered that the issue be handled as a matter of strictest secrecy, and subsequent chief executives—including that great spy-chaser of the 1940s, Richard M. Nixon—followed suit; David Burnham, "C.I.A. Said in 1974 Israel Had A-bombs," *New York Times*, Jan. 27, 1978; "The Case of the Missing Uranium," *Atlantic Monthly*, Jan. 1979.

only one county in the United States has proven amenable to accepting an MRS within its boundaries, and its willingness to do so was quickly overridden by the state.[145]

Federal pitchmen have therefore concentrated all but exclusively on convincing native governments—which, whenever it's convenient for U.S. authorities, are considered exempt from state and local jurisdiction—to accept the dumps.[146] As longtime indigenous rights activist Grace Thorpe has observed:

> The U.S. government targeted Native Americans for several reasons: their lands are some of the most isolated in North America, they are some of the most impoverished and, consequently, most politically vulnerable citizens and, perhaps most important, tribal sovereignty can be used to bypass state environmental laws... How ironic that, after centuries of attempting to destroy it, the U.S. government is suddenly interested in promoting Native American sovereignty—just to dump its lethal garbage.[147]

There can be little doubt that during the early '90s DOE negotiators played heavily upon the colonially imposed destitution of indigenous peoples in peddling their wares.

> Sixteen tribes initially applied for $100,000 grants from DOE to study the MRS option on Native lands. The lucrative DOE offer included up to $3 million to actually identify a site for an MRS and as much as $5 million per year for any tribe to accept the deal. The government also offered to build roads, hospitals, schools, railroads, airports and recreation facilities [most of which the Indians should have been receiving anyway].[148]

Another $100,000 was passed along in 1992 to the federally oriented National Congress of American Indians (NCAI) to garner its assistance in selling the proposition to its constituents, while a whopping $1.2 million—80 percent of the DOE's budget for such purposes—was lavished on the Council of Energy Resource Tribes (CERT), an entity created for the sole purpose of brokering native mineral rights.[149] Despite the best efforts of both organizations—CERT in particular went beyond the MRS concept to promote acceptance of a repository at Hanford by the Yakimas, Nez Percé, and Umatillas—the campaign was largely a failure.* By 1995, only three reservations—Mescalero, Skull Valley, and Ft. McDermitt in northern Nevada—indicated any willingness to accept a dump, regardless of the material incentives offered.

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*Actually, CERT had been hard at work trying to arrange agreement of these three peoples in the establishment of a repository at Hanford since NWPA was enacted, nearly a decade before. "In 1983 Congress redirected much of DOE's civilian budget toward...waste management. Some of this money went into CERT's coffers when the Confederated Tribes of the Umatilla Reservation and the Nez Percé Tribe [both CERT members] hired CERT to help study the proposed Hanford nuclear waste site... In 1986 DOE still provided $500,000 to CERT through [an] interagency grant [while the] EPA provided half that or $250,000 [per year]... Yakima, Umatilla, and Nez Percé [also] received

The reasoning which led to this result is instructive. At Skull Valley, the feeling expressed by many residents is that they and their land may already have been sacrificed, in part to radiation blown in over the years from the not-far-distant Nevada Test Site, in part to a host of nuclear, chemical, and bacteriological contaminants emanating from military bases closer to home. Even the specific area committed as an MRS site has long been leased to several corporations as a rocket testing range.[150] As tribal member Leon Bear observes:

> People need to understand that this whole area has already been deemed a waste zone by the federal government, the state of Utah, and the country... Tooele Depot, a military site, stores 40% of the nation's nerve gas and other hazardous gas only 40 miles away from us. Dugway Proving Grounds...is only 14 miles away, and it experiments with viruses like plague and tuberculosis. Within a 40 mile radius there are three hazardous waste dumps and a "low-level" radioactive waste dump. From all directions, north, south, east, and west we're surrounded by the waste of Tooele County, the state of Utah, and U.S. society.[151]

The sentiment at Skull Valley, that it is better to at least charge for one's demise than endure the suffering for free, is shared by an appreciable segment of the Mescalero population. As one reservation resident noted, the feeling of many people is that "since they are getting impacted by nuclear waste [anyway] they should have a chance to benefit economically."[152] Or, as another put it, "The federal government has forced us to choose between being environmentally conscious [and] starving."[153]

More important than subsidies, however, may be the fact that many Mescaleros are now experiencing an overwhelming sense of hopelessness, based in the knowledge that not only are they just downwind from White Sands, but that—over their strong objections—the first U.S. nuclear repository has been sited in the Carlsbad Caverns area, immediately to their east.[154] This is the so-called "Waste Isolation Pilot Plant" (WIPP), a plan to store virtually all military transuranics produced after 1970—57,359 cubic

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$12.8 million over five years to help them participate in decision making. The money was spent on environmental, social impact, and cultural studies... CERT provided environmental and computer training while the National Congress of American Indians helped...with educational workshops and policy issues"; Ambler, *Breaking the Iron Bonds, op. cit.*, pp. 115, 234.

meters of it—in a subsurface salt bed already scored by one of Operation Plowshare's underground nuclear detonations.*

It now appears that the deep salt beds below Carlsbad are not so dry as was once believed by the National Academy of Sciences, a matter which could lead to the corrosion of the storage cannisters in which the repository's plutonium is to be contained and correspondingly massive contamination of the underlying Rustler Acquifer.[155] Serious questions have also arisen as to whether the mass of materials stored in such close quarters—after accomodating its present allocation of transuranics, the WIPP will still retain some 70 percent of its space availability to meet "future requirements," official shorthand for continuing nuclear weapons production—might not "go critical" and thereby set off an incalculably large atomic explosion.[156] Nevertheless, Secretary of Energy Hazel O'Leary has announced unequivocally that the facility will open in 1998.[157]

Even worse problems are evident at Yucca Mountain, located on the southwestern boundary of the Nevada Test Site, where a $15 billion repository to accommodate 70,000 tons of mostly civilian high-level waste is being imposed on the long-suffering Newes and Western Paiutes.[158] Not only is "spontaneous detonation" just as much a threat as at the WIPP, but Yucca Mountain, located in a volcanically active region, is undercut by no less than 32 geological fault lines.[159] Needless to say, no amount of engineering brilliance can ensure the repository's contents will remain undisturbed through a quarter-million years of earthquakes interspersed with volcanic eruptions. Once again, however, the project is being moved forward as rapidly as possible.[160]

As if this were not enough, it was announced in 1993 by the Southwestern Compact, a consortium of state governments, that it had "decided to keep the option" of siting a huge low-level waste dump in the Mojave Desert's Ward Valley, near the small town of Needles on the California/Arizona boundary.[161] Envisioned as being large enough to accept the contents of all six existing—and failed—low-level facilities in the United States with room to spare for the next thirty years, the proposed site

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*This, of course, leaves unaddressed the question of transuranic military waste—about 250,000 cubic meters of it—produced *before* 1970. Most of it is buried in shallow trenches at the Nevada Test Site and other locations, and is "difficult to retrieve" since the earth around it is now irradiated to an unknown depth. Present planning has gone no further than to leave it where it is, leaching into the environment at a steady rate; Rosenthal, *At the Heart of the Bomb, op. cit.*, p. 195.

is less than 18 miles from the Colorado River and directly above an acquifer.* It is also very close to the Fort Mojave, Chemehuavi Valley, and Colorado River Indian Tribes reservations, and upstream from those of the Cocopahs and Quechanis around Yuma, Arizona.

Taken as a whole, the pattern of using "deserts as dumps" which has emerged in nuclear waste disposal practices over the past decade serves to confirm suspicions, already well founded, that creation of sacrificial geographies within the United States has been an integral aspect of Cold War policies and planning for nearly fifty years.[162] In many ways, the siting of repositories in particular, since they are explicitly intended to remain in place "forever," may be seen as a sort of capstone gesture in this regard. And, to be sure, the collateral genocide of those indigenous peoples whose lands lie within the boundaries of the sacrifice zones, nations whose ultimate negation has always been implicitly bound up in the very nature and depth of their colonization, is thus, finally and irrevocably, to be consumated.[163]

Heeding the Miner's Canary

Felix Cohen, widely considered to have been the leading authority on federal Indian law, once likened the function of indigenous peoples in the United States to that of a miner's canary. As the bird did for the miner, he wrote, Indians have been made to serve as an early warning device of impending danger for the dominant society. By using native people essentially as guinea pigs for experiments in socioeconomic and political engineering, federal policymakers have been able to assess the relative degrees of efficacy and consequence attending implementation of their ideas. Based upon these results, the government can "tune" its programs, enhancing effectiveness and reducing at least the appearance of likely costs to acceptable levels before exporting them to the broader U.S. society. In some cases, where the effects of policies have been found to be unexpectedly unredeeming or counterproductive when applied to Indians, programmatic export has been avoided altogether, thereby sparing mainstream America the pain of experiencing such things for itself.[164]

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*The plan is to "inter" the material—which contains plutonium, strontium, and cesium among a wide range of hyperactive and longlived substances—in five unlined trenches, each about the size of a football field. The facility is to be run by U.S. Ecology, formerly Nuclear Engineering, a corporation whose track record includes oversight of a similar—now closed and badly leaking—facility at Barnwell, Utah, as well as the disasterous West Valley enterprise in upstate New York; Kulentz, *Geographies of Sacrifice, op. cit.*, pp. 156–7; John J. Berger, *Nuclear Power: The Unviable Option* (Palo Alto, CA: Ramparts Press, 1976) p. 104.

At another level, which Cohen does not address, techniques of domination have been consistently field-tested in Native North America, a matter allowing their refinement before they are introduced into other settings both at home and abroad.* At still another, America's internal colonies have been used throughout the second half of the twentieth century, and increasingly so, as laboratories in which the impacts of certain scientific-industrial enterprises could be evaluated and perhaps modified prior to their replication outside reservation boundaries.[165] Beyond that, Indian Country has served as a convenient locale in which to place those sectors of the research, development, and production processes which simply cannot be sufficiently sanitized to be practicable elsewhere.[166]

So it was meant to be with the radioactive colonization of western reservations during the Cold War. They and their occupants were intended to absorb the irremediably dirty parts of the nuclear process—from mining to dumping—while elite sectors of the colonizing society reaped the profits of military/technical ascendancy, with the broader population narcotized by illusions of sharing in this supremacy, as well as the promised benefits of an energy source which was to be cheap, clean, quiet, and endlessly available for their consumption.[167] So long as only the canary died, all was considered to be well; planners and technicians were presumed to learn thereby what not to do, or at least how not to do it, in more "important" locales, among more "significant" concentrations of population. Had it actually worked that way, the unfortunate fact is that most of America would have remained content.[168]

The problem, of course, is that it *didn't* work that way. The marvelously engineered reactors—all 128 of them—invariably leaked radiadation like sieves, as did the research labs and increasingly high-tech production facili-

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*For example, two operational plans for domestic counterinsurgency, code-named "Garden Plot" and "Cable Splicer," each of them utilizing combinations of federal, state, and local police as well as military personnel and private vigilante organizations to quell "civil insurrections," were field tested against the American Indian Movement on the Pine Ridge Reservation during the mid-'70s. Drafted for then-California Governor Ronald Reagan during the late 1960s by security consultant Louis Giufrida, and revised on the basis of the Pine Ridge exercises, both plans were incorporated into the contingency inventory of the Federal Emergency Management Agency (FEMA) after Giufrida was named its founding director by the Reagan presidential administration in 1981; see Ward Churchill and Jim Vander Wall, *Agents of Repression: The FBI's Secret Wars Against the Black Panther Party and the American Indian Movement* (Boston: South End Press, 1988) pp. 181–98. In the same manner, methods of maintaining a formally democratic veneer over the functioning of what amount to puppet governments were thoroughly worked out on reservations, before they were applied abroad in Third World countries; see Edward S. Herman and Frank Brodhead, *Demonstration Elections: U.S. Staged Elections in the Dominican Republic, Vietnam and El Salvador* (Boston: South End Press, 1984).

ties.[169] Strontium-90–laden fallout from atmospheric bomb testing and the occasional venting of an underground blast failed to confine itself to the remote areas in which most detonations occurred, spreading out rapidly, globally, and with utter unpredictability, to turn faraway places like Albany, New York, into radioactive "hot spots."* It was discovered, moreover, that the lethal filth which was supposed to remain confined to the colonies couldn't be: windblown tailings particles are unaware that they are supposed to quit when they reach a reservation boundary; irradiated surface water does not know it's supposed to stop flowing downstream before reaching a non-Indian community; the radioactive content of groundwater has yet to be informed that it must concentrate itself exclusively beneath the wellheads of indigenous people.

The most obvious result is that, as cancer rates, birth defects, and the like have spiraled out of control at Navajo, Laguna, and other reservations on which the worst impacts of the nuclear process were supposed to have been contained, the same maladies have grown dramatically—albeit to a lesser extent—among the general population. Cancers of all types have increased among American males by 18.6 percent since 1975, 12.4 percent among women.[170]

> The percentage of underweight live births rose by over 40 percent in New York State between 1945 and 1965, as strontium-90 seeped into human bone from atmospheric abuse. [Statistician Jay] Gould charts an epidemic rise in cancer and leukemia during the fifties in children aged 5 to 9. By 1980, they were hit by a wave of immune deficiency diseases never before experienced by this age group [a timing which corresponds well

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* "There are many so-called hot spots in the United States—that is, areas far from the test location where fallout was much more intense than in surrounding areas. Perhaps the best-known was Albany, New York. The hot spot occurred during the Upshot-Knothole series [of tests in Nevada] due to a severe thunderstorm, which happened just as the fallout cloud passed overhead at an altitude of 40,000 feet... In addition to large gamma doses, it is likely that many people...received large doses of beta radiation to their skin and internal doses due to inhalation or ingestion... In intense hot spot areas, children playing outdoors, and therefore possibly breathing heavily, would have been especially at risk of high inhalation doses... Children who drank milk from cows grazing in these general areas received large iodine-131 doses, increasing their risk of thyroid problems such as hypothyroidism and thyroid cancer... Strontium, whose biological behavior mimics calcium, [also] concentrates in milk and bone"; Robbins, Makhijani, and Yih, *Radioactive Heaven, op. cit.*, pp. 62–3. The issue of hot spots is taken up in more detail in Jacob Shapiro, *Radiation Protection* (Cambridge, MA: Harvard University Press, [3rd ed.] 1990). The citizens of Albany have complained that their arbitrary exposure violated both the "innocence" of their children and the trust they had placed in officials who assurred them they were safe from any possibility of adverse effects from testing. This is true enough. But what led these people to believe their own children were in any way more innocent than those of the Newe and Paiutes around the Nevada Test Site—or those of the Micronesians on Bikini, Enewetak, Utirik, and Rongelap—or that they themselves were more entitled to safety than those peoples, is a bit mysterious. At least in the case of Albany residents, it was their own government doing the testing.

> with the epidemic rise of AIDS among adults. He also] documents the impact of radiation on residents of "nuclear counties," the 1,319 counties in proximity to one of the [more than one hundred] civilian and military nuclear reactors in the United States. The results are alarming: Cancer, AIDS, various birth defects and chronic fatigue syndrome occur [much] more frequently in irradiated areas than elsewhere. As compared with every county in the nation, fifty-five of sixty reactor sites had a significantly elevated current breast cancer rate that cannot be explained by chance or genetics.[171]

By 1970, such problems had already become so acute that John Gofman and his colleague Arthur Tamplin were describing what was happening—particularly what they saw as an unstated but very conscious official effort to vector the bulk of the effects into poor communities—"population control through nuclear pollution."[172] It was this understanding, too, which led Gofman a decade later, because of the nature of his earlier work with atomic energy, to publicly pronounce both himself and the institutions in which he had worked guilty of Crimes Against Humanity.

> People like myself and a lot of the atomic energy scientists of the late fifties deserve Nuremberg trials. At Nuremberg we said that those who participate in human experimentation are committing a crime. Scientists like myself who said in 1957, "Maybe Linus Pauling is right about radiation causing cancer, but we really don't know, and therefore we shouldn't stop progress," were saying in essence it's all right to experiment. . . . But once you know that your nuclear power plants are going to release radioactivity, and kill a certain number of people, you are no longer committing the crime of experimentation—you are committing a higher crime. Scientists who support these nuclear plants—knowing the effects of radiation—don't deserve trials for experimentation; they deserve trials for murder.[173]

Theoretically, the impetus leading to all this—the Cold War—ended with the collapse of the Soviet Union in 1989. The goals and objectives outlined in NSC 68 were at that point completely fulfilled. Yet the structural imperatives created by the process—fully a third of the U.S. economy was geared to supporting the military by 1980, and more than half the country's scientific community was harnessed to nuclear research in one form or another—and the mentality it had generated among elites virtually guaranteed a continuation of what one analyst has referred to as "plutonium culture."[174] Indeed, there were strong indications that the nuclear establishment, in both its military and civilian configurations, was preparing to enter a whole new growth phase during the immediate post–Cold War period.

For starters, in 1991 President George Bush advanced a "national energy strategy" of constructing *several hundred* new reactors over twenty years, with an anticipated cost of somewhere between $390 billion and $1.3 *trillion.*[175] Coupled to thus announcement, a mass media advertising blitz was undertaken by the nuclear industry's "big four"—the Westinghouse, Babcock & Wilcox, Bechtel, and Combustion Engineering corporations—featuring a 40ish-looking female yuppie. Purporting to have been an anti-nuclear activist in college who had since "grown up," she warmly endorsed a vast expansion of atomic power generation as "the safe alternative" for her baby daughter.[176] Meanwhile, an ongoing avalanche of extraordinarily dubious, officially endorsed, and massively reported epidemiology studies was initiated, which has diverted the onus of the country's mounting cancer epidemic—and, most recently, responsibility for birth defects as well—further and further away from the systemically crucial nuclear establishment and onto the relatively marginal tobacco industry.*

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* This is a virtual replay of the scam perpetrated by the nuclear industry—with much official complicity—against Diné miners during the late 1970s and early '80s, only this time writ much larger. That the National Institutes for Health—which have rejected as "inconclusive" literally every study linking the nuclear establishment to cancer, infant mortality, and birth defects, no matter *how* well-substantiated— suddenly showed such enthusiasm for research blaming *any* other substance(s) should have sounded alarms, at least for progressives. This should have been all the more true when well-qualified independent observers like the head of hard sciences at Yale, himself a lifelong non-smoker, publicly categorized the quality of research evident in the Institutes' studies of the effects of secondhand tobacco smoke as being so shoddy that it "would not be accepted as graduate work" at his university. The alarms should have been shrieking by the time the EPA inscribed secondhand smoke as a "Class-A Carcinogen"—dubbing it the "number one preventable environmental health hazard in the country"—despite a finding by the Congressional Research Office that "statistical evidence does not appear to support a conclusion that there are substantial health effects of passive smoking." As Mike Gough, then a senior associate with the congressional Office of Technology Assessment, put it in 1994, "I am adamantly opposed to smoking; I completely agree with the magnitude of the health threat for people who smoke. But I think the EPA played very fast and loose with its own rules in order to come to the conclusion that [secondhand] smoke is a carcinogen"; quoted in David Shaw, *The Pleasure Police* (New York: Doubleday, 1996) p. 143. On December 17, 1996, it was announced on CNN *Headline News* that a team of government-funded researchers in England, another country with a substantial nuclear establishment and escalating consequences, had determined that smoking also causes birth defects at a rate 30 percent higher than among nonsmokers (giving rise to the obvious question of why, if this were true, such a massive disparity wasn't noticed in the aftermaths of either world war, during which the numbers of people smoking skyrocketed). Much ado is made about whether anyone seeking to counter such tripe hasn't been "hired by the cigarette manufacturers"; nobody seems to wonder whether those producing the tripe itself don't owe allegience to the nuclear industry. Historically, the kind of manipulation we are witnessing on the part of government agencies has *always* served as a means of protecting something officially considered important by jettisoning something else which is deemed less so; see generally, Chomsky, *Necessary Illusions, op. cit.* In this case—since cancer rates, etc., must be blamed on *something*—it appears to have been decided that the incredibly lucrative and strategically central nuclear establishment will be buffered by expending the tobacco industry, either in part, or, if necessary, in its domestic entirety (its profits being largely recoverable in the export trade

The drive to build new reactors was curtailed, at least temporarily, by Bush's electoral defeat at the hands of challenger Bill Clinton in 1992. The latter, however, after a brief moratorium has allowed the resumption of limited weapons testing, especially with regard to neutron devices.* Consideration is also being given to reopening not only the Jackpile Mine at Laguna, but at least some operations on Navajo, Wind River, and Spokane. Additionally, there has been discussion of entirely new extraction and milling facilities being established as "economic stimulants" on the Hualapai, Havasupi, Ute Mountain, Cañoncito Navajo, Zuni, Acoma, Zia, and Jemez reservations in Arizona, Colorado, and New Mexico.[177]

Even if these plans don't bear fruit in the immediate future, their very existence gives ample indication that the genocidal political economy of radioactive colonialism has by no means run its course on American Indian reservations in the United States. Most likely, their delay would indicate only that it remains cheaper for U.S. corporations to acquire yellowcake from Canada, their new NAFTA trading partner to the north, which has itself been engaged in an increasingly intensive plundering of uranium from native lands around Cluff, Key, and Wolleston lakes in northern Saskatchewan.[178] The region has the advantage not only of being more remote from centers of non-Indian population than anything the United States has to offer, but of possessing what is far and away the world's richest known uranium deposit, at Cigar Lake.†

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anyway). Such a program yields the added advantage of generating a substantial public demand—led, incredibly enough, by self-proclaimed "progressives"—for increased governmental regimentation of individual behavior, thus reinforcing rampant fascistic proclivities on the part of the state; for analysis of this last trend, see Bertram Gross, *Friendly Fascism: The New Face of Power in America* (Boston: South End Press, 1982).

* The plutonium-based neutron bomb, first tested in the early '70s, is designed to employ an ultraintensive spray of radioactivity rather than blast to inflict damage. It will thus kill everything within range upon detonation, but leave buildings and other structures intact; Helen Caldicott, *Nuclear Madness: What You Can Do* (Brookline, MA: Autumn Press, 1978) pp. 159–60.

† The Cigar Lake deposit contains an estimated 100 million kilos of uranium ore averaging over 15-percent purity, with some pockets, perhaps as much as a tenth of the whole, averaging an incredible 60 percent (this is as compared to a worldwide average yield of 3–4 percent). In addition, there are another 50 million kilos of ore averaging 4.7-percent purity. The Cigar Lake deposit, which is at a depth running 410 to 440 meters below ground, will have to be shaft-mined and is therefore simply too hot to be extracted by humans, even a completely expendable native labor force. A special system of robotics is therefore being developed for the purpose; Steven Salaff, "The Cigar Lake Mine: The Real Drilling Begins at Sakatchewan's Prize Uranium Deposit," *Saskatchewan Business*, Mar. 1985. Five new mines have also been opened on the west side of Wolleston Lake and another at Waterbury Lake since 1990. This was to accommodate, as a preliminary to the finalization of NAFTA, increased demand by U.S. corporations; Bud Jorgenson, "Easing of Uranium Export Rules Urged for Canada," *Ottawa Globe and Mail*, May 4, 1986.

In days gone by, when a real miner's canary began to show signs of distress, its owners could immediately abandon it to its fate, themselves scurrying to safety at the mouth of the mine. The cynically analogous use of indigenous nations in the context of nuclear proliferation is unworkable. As should by now be apparent, in this case there is quite simply nowhere safe to run. Rather than serving as an early warning of avoidable danger, then, the fate of radioactively colonized native peoples—whether concentrated in the Grants Uranium Belt or scattered across the upper reaches of Saskatchewan, around the Nevada Test Site or far out in the northern Pacific—should be seen merely as a prefiguration of what will happen—indeed, is *happening*—to everyone else. "The chickens," as Malcolm X once put it with typically eloquent bluntness, have truly "come home to roost."[179]

Reversing the Cold War Legacy

It may be, as Dr. Rosalie Bertell worried more than fifteen years ago, that it is already too late, that Cold War and profit-generated nuclear contamination is already so ubiquitous as to have instigated an irreversible process of human extinction ("species suicide").[180] On the other hand, as Jay M. Gould has more recently suggested, it may be that although it is now very late in the game, there is still hope, the outcome is not yet conclusively determined.[181] Certainly, the marvelously complex organism we call earth possesses recuperative powers unfathomed—and perhaps unfathomable—within the arrogant heritage of Western science. Left to its own devices, it is entirely possible that the planet itself can begin to contain that which America's most accomplished engineers cannot, thus rehabilitating to some extent the global ecosystem upon which they and we are equally dependent for survival.[182]

The buck can be passed to the earth in this regard, however, no more than the impacts of nuclear contamination can be neatly displaced onto the internal colonies of Native North America. People are integral to, not something apart from, the planetary ecology. A certain range of responsibilities thus inhere in us, the shirking of which has led us inerringly to our present circumstance.[183] There is no way out of it: only a conscious and unswerving (re)assumption of these responsibilities by the great mass of humanity can favorably alter the situation in which we now find ourselves. The alternative is a not-so-distant extinction, not just of humans, but more likely of all higher vertebrate species as well.[184]

Within the framework of this discussion, the nature of our responsibilities is not mysterious. It does not devolve upon the cleanup of what has already been done. Rather, it concerns prevention of any further proliferation of radioactive contaminants in the environment. This means that we must, both individually and collectively, devise ways and means of preventing even one of George Bush's hundreds of new reactors from being built.[185] We must find ways to actually stop the testing and production, not only of ever more sophisticated nuclear weapons, but of depleted uranium ammunition and comparable military-scientific innovations. The same holds true for the civil society's technological counterparts, from plutonium-powered pacemakers to neutron-driven spacecraft.*

This will be neither easy nor painless. Among the many negative attributes of the U.S.'s Cold War drive to realize itself as a full-fledged "national security state" has been a quintupling of the proportionate level of police power available to the government for purposes of ensuring that the citizenry does not interfere in any meaningful way with the functioning of the military-corporate status quo.[186] More to the point in some ways, the energy corporations themselves have been authorized to form autonomous security forces of their own.[187] In addition to the 110,000 federal and 554,000 state and local police personnel now at large in America, the society is infested with more than 1.5 million "private" cops, all of them armed and provided the power of arrest, tied together by an unprecedentedly sophisticated and continuously evolving web of electronic files and communications, and feeding the world's largest—and steadily burgeoning—prison system.[188]

Plainly, the nuclear establishment has organized itself quite well to prevent any genuine disruption of business as usual. Under such conditions, a dispersal of oppositional energy and resources across a "broad front," combatting the symptomologies of nuclear technology rather than the figuratively physiological cause of the "disease," would prove disastrously self-defeating. A common focus or point of attack is clearly necessary if anything constructive is to be accomplished. In this connection, simple logic dictates—as it always did, if anyone outside the reservations had bothered to look at things honestly—that the crux of any strategy to halt the nuclear process is at its front end, in the mining and milling zones.

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*The recent atmospheric disentegration of a plutonium-laden Russian satellite should say all that needs saying about why this is so. The "controversy" about whether such a thing might happen has been going on for almost twenty years, since the Soviet Cosmos 954 crashed in Canada on January 24, 1978, without any real alteration in the practice of putting reactors aboard such space vehicles; Richard D. Lyons, "Carter Favors Ban on Atomic Reactors in Earth Satellites," *New York Times*, Jan. 31, 1978.

If the nuclear establishment can't get uranium ore out of the ground, it cannot be milled into yellowcake. Without yellowcake, there can be no production of plutonium or uranium-235.[189] Without these ingredients, both reactors and nuclear weapons are impossible to make. Hence, no future testing or release of a witch's cauldron of radioactive waste by-products from production and reactor sites. It follows, too, that the matter of waste containment becomes self-addressing, at least in the sense that it can be construed as something fixed rather than as a continuously growing phenomenon. The essential question at hand can thus be reduced to how we might most effectively begin choking off the flow of uranium at its source.

Here, another logical sequence presents itself. Since the preponderance of uranium mining in North America has occurred, is occurring, and is projected to *continue* occurring within native territories, and since this has been possible primarily, or even entirely, because of the system of internal colonial domination which has been imposed upon indigenous nations, it is difficult to avoid the conclusion that *de*colonization of these same nations/territories offers the key to resolving the entire nuclear delimma.[190] With native people restored to control over our own lands, lives, and politicoeconomic destinies, the "survivability" of the nuclear establishment is nil, an equation which holds as true in Canada—or in Namibia, Australia, India, China, the former Soviet Union, or anywhere else—as it does in the United States.

To accomplish such a task will require concentration and true clarity of vision. We cannot afford to allow ourselves the distraction of such diversionary silliness as officially sponsored antismoking crusades, or to be deluded into believing that oxymoronic fantasies like Vice President Al Gore's notion of "sustainable development" can do anything but make matters worse than they already are.* If the decolonization of Native North America is to be accomplished—as it must be, if there is to be a sustainable future for anyone,

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*Albert E. Gore, *Earth in the Balance* (New York: Houghton-Mifflin, 1992). It should be noted that "development" is the standard establishment euphemism for "destruction," e.g., a grassy field has been "developed" when it has been covered under a layer of asphalt for use as a parking lot, a mountain has been "developed" when it has been converted into gravel for use in mixing concrete, a mineral deposit is "developed" when it is dug up and consumed, and so on. Obviously, such processes are fundamentally antithetical to the very possibility of sustainability in a finite system such as the earth. Slowing the rate by which the processes occur, as Gore suggests, does nothing to alter their ultimate effect. The one possible exemption to this rule might be a breeder reactor, an application of technology to which the vice president purports to be strongly opposed. At bottom, his "theory" is little more than another mindless assertion that it is possible to have your cake and eat it, too (which is undoubtedly why it's so popular).

anywhere—it will require every bit of effort, attention, and willingness to absorb punishment that any and all of us can muster, for as long as it takes, until it is done.

Then, and *only* then, can we reasonably expect to be able to ascertain the extent and type of contamination we suffer, chart the boundaries of sacrifice areas with some degree of accuracy, devise methods of neutralizing or encapsulating the toxins which permeate our remaining habitable environments, (re)discover truly sustainable modes of economy and reorganize our longterm relations with one another in a manner which is itself balanced and sustainable. In taking the liberation of the First American as our First Priority we place all of this within our collective grasp, not only because we finally "stop the nukes," but because we will have at long last reversed the polarities of human relations, and the relationship of humanity to the natural order which gave rise to the nukes in the first place. No less total a transformation of consciousness and practice is required if we are to draw back from the abyss which is so rapidly opening beneath our feet.

As the Suquamish leader Sealth (Seattle) reflected in 1854, at a similarly profound juncture in his own people's history, "Tribe follows tribe, and nation follows nation, like the waves of the sea. Your time of decay may be distant, but it must surely come, for even the white man whose god walked with him and talked with him as friend to friend, cannot be exempt from the common destiny. We may be brothers after all. We shall see."[191] If so, it will be possible to say that the Cold War, its antecedent mentalities, and its legacy have been put behind us, once and for all. We can join hands as relatives, heal our mutual wounds, and go forward together as nations of people bound to one another by the reciprocity of our dignity and respect. Are such things possible? In the end, we can only believe that they are and struggle with all our beings to attain them. Our future generations demand no less.

Notes

1. Russel Barsh, "Indian Land Claims Policy in the United States," *North Dakota Law Review*, No. 58, 1982; *One-Third of the Nation's Land*, *op. cit.*

2. See, e.g., J.R. Miller, *Sweet Promises* (Toronto: University of Toronto Press, 1991).

3. *Lonewolf v. Hitchcock* (187 U.S. 553 (1903)). For analysis, see C. Harvey, "Congressional Plenary Power Over Indian Affairs: A Doctrine Rooted in Prejudice," *American Indian Law Review*, No. 10, 1982; Ann Laquer Estin, "*Lonewolf v. Hitchcock*: The Long Shadow," in Sandra L. Cadwalader and Vine Deloria, Jr., eds., *The Aggressions of Civilization: Federal Indian Policy Since the 1880s* (Philadelphia: Temple University Press, 1984) pp. 215–45.

4. The issue of reservation resources is brought up repeatedly in the major official policy study undertaken during the period, that of the so-called "Committee of One Hundred" prominent civic and business leaders chaired by Lewis Meriam; U.S. House of Representatives, *The Indian Problem: Resolution of the Committee of One-Hundred by the Secretary of Interior and Review of the Indian Problem* (Washington, D.C.: 68th Cong., 1st Sess., U.S. Government Printing Office, 1928); Lewis Meriam, et al., *The Problem of Indian Administration* (Baltimore: Johns Hopkins University Press, 1928).

5. See, e.g., Ronald L. Trosper, "Appendix I: Indian Minerals," in American Indian Policy Review Commission, *Task Force 7 Final Report: Reservation and Resource Development and Protection* (Washington, D.C.: 95th Cong., 1st Sess., U.S. Government Printing Office, 1977); U.S. Department of Interior, Bureau of Indian Affairs, *Indian Lands Map: Oil, Gas and Minerals on Indian Reservations* (Washington, D.C.: U.S. Government Printing Office, 1978).

6. Kenneth Philp, *Assault on Assimilation: John Collier's Crusade for Indian Reform, 1920–1954* (Tucson: University of Arizona Press, 1977).

7. Indian Reorganization Act (ch. 576, 48 Stat. 948, now codified at 25 U.S.C. 461–279 (1934)). The details (but not the conclusions) are provided in Vine Deloria, Jr., and Clifford M. Lytle, *The Nations Within: The Past and Future of American Indian Sovereignty* (New York: Pantheon, 1984). Also see my "American Indian Self-Governance: Fact, Fantasy and Prospects for the Future," in *Struggle for the Land: Indigenous Resistance to Genocide, Ecocide and Expropriation in Contemporary North America* (Monroe, ME: Common Courage Press, 1993) pp. 375–402.

8. Depiction of the structural relationship at issue as "colonialism" is not restricted to "radicals" such as me; see, e.g., U.S. Department of Justice, Commission on Civil Rights, *The Navajo Nation: An American Colony* (Washington, D.C.: U.S. Government Printing Office, 1976). For analysis of the effects of the government's self-assigned "trust" prerogatives vis-à-vis mineral exploitation on reservations, see Joseph Jorgenson, ed., *Native Americans and Energy Development, II* (Cambridge, MA: Anthropological Resource Center/Seventh Generation Fund, 1984).

9. Richard J. Barnet and Ronald E. Müller, *Global Reach: The Power of Multinational Corporations* (New York: Touchstone Books, 1974); Michael Garrity, "The U.S. Colonial Empire is as Close as the Nearest Reservation," in Holly Sklar, ed., *Trilateralism: The Trilateral Commission and Elite Planning for World Management* (Boston: South End Press, 1980) pp. 238–68.

10. U.S. Bureau of the Census, *General Social and Economic Characteristics: United States Summary* (Washington, D.C.: U.S. Government Printing Office, 1983); U.S. Bureau of the Census, Population Division, Racial Statistics Branch, *A Statistical Profile of the American Indian Population* (Washington, D.C.: U.S. Government Printing Office, 1984). An excellent overview of these conditions and their effects is provided in Teresa L. Amott and Julie A. Matthaei, *Race, Gender and Work: A Multicultural History of Women in the United States* (Boston: South End Press, 1991) pp. 31–62.

11. U.S. Department of Health and Human Services, Public Health Service, *Chart Series Book* (Washington, D.C.: U.S. Government Printing Office, 1988).

12. Joy Leland, *Firewater Myths: American Indian Drinking and Alcohol Addiction* (New Brunswick, NJ: Rutgers Center for Alcohol Studies, 1976). On the dynamics of violence involved, see Frantz Fanon, *The Wretched of the Earth* (New York: Grove Press, 1966).

13. *Chart Series Book, op. cit.*; *General Social and Economic Characteristics, op. cit.*

14. Eduardo Galeano, *Open Veins of Latin America: Five Centuries of the Pillage of a Continent* (New York: Monthly Review, 1973) p. 12.

15. Richard Hoppe, "A Stretch of Desert Along Route 66—the Grants Belt—Is Chief Locale for

U.S. Uranium," *Engineering and Mining Journal*, Vol. 79, No. 11, 1978.

16. Leslie R. Groves, *Now It Can Be Told: The Story of the Manhattan Project* (New York: Harper & Bros., 1962); Stephane Groueff, *The Manhattan Project* (Boston: Little, Brown, 1967); Richard Rhodes, *The Making of the Atomic Bomb* (New York: Simon & Schuster, 1986). The official version will be found in Henry DeWolf Smith, *Atomic Energy for Military Purposes: The Official Report on the Development of the Atomic Bomb Under the Auspices of the United States Government, 1940–1945* (Princeton, NJ: Princeton University Press, 1945).

17. Hosteen Kinlicheel, "An Overview of Uranium and Nuclear Development on Indian Lands in the Southwest," *Southwest Indigenous Uranium Forum Newsletter*, Sept. 1993, p. 5.

18. Valerie L. Kulentz, *Geographies of Sacrifice: Nuclear Landscapes and Their Social Consequences, 1940–1996* (forthcoming from Routledge, 1997) mss. pp. 23, 31.

19. Hal Rothman, *On Rims and Ridges: The Los Alamos Area Since 1880* (Lincoln: University of Nebraska Press, 1992) p. 208.

20. Kenneth T. Bainbridge, *Trinity* (Los Alamos, NM: Los Alamos National Scientific Laboratory, 1976 edited release of 1945 original); Kulentz, *Geographies of Sacrifice, op. cit.*, p. 31; Richard Miller, *Under the Cloud: The Decades of Nuclear Testing* (New York: Free Press, 1986) p. 13. On the exposure of U.S. troops for experimental purposes, see Howard I. Rosenberg, *Atomic Soldiers: American Victims of Nuclear Experiments* (Boston: Beacon, 1980); Michael Uhl and Tod Ensign, *G.I. Guinea Pigs: How the Pentagon Exposed Our Troops to Dangers More Deadly Than War* (New York: Playboy Press, 1980).

21. U.S. pretensions in this regard are handled well in Martin Sherwin's *A World Destroyed: The Atomic Bomb and the Grand Alliance* (New York: Alfred A. Knopf, 1975); also see Ronald W. Clark, *The Greatest Power on Earth* (New York: Harper & Row, 1980). A good articulation of the hard Left view will be found in James S. Allen, *Atomic Imperialism: The State, Monopoly and the Bomb* (New York: International, 1952).

22. David Alan Rosenberg, "The U.S. Nuclear Stockpile, 1945 to 1950," *Bulletin of Atomic Scientists*, Mat 1980.

23. Kinlicheel, "An Overview," *op. cit.*; Winona LaDuke, "The History of Uranium Mining: Who Are These Companies and Where Did They Come From?," *Black Hills/Paha Sapa Report*, Vol. 1, No. 1, 1979. On the Atomic Energy Act and establishment of the AEC, see Anna Gyorgy and Friends, *No Nukes: Everyone's Guide to Nuclear Power* (Boston: South End Press, 1979) pp. 7–8.

24. See generally, Debra Rosenthal, *At the Heart of the Bomb: The Dangerous Allure of Weapons Work* (Menlo Park, CA: Addison-Wesley, 1990); Dan O'Neill, *The Firecracker Boys* (New York: St. Martin's Press, 1994).

25. For background to the shift in foreign policy emphasis involved, see Roger Rapaport, *The Great American Bomb Machine* (New York: E.P. Dutton, 1971). Also see the Introduction to Noam Chomsky's *Towards a New Cold War: Essays on the Current Crisis and How We Got There* (New York: Pantheon, 1983) esp. pp. 19–24.

26. For the conservative view, see John Lewis Gaddis, *The United States and the Origins of the Cold War, 1941–1947* (New York: Columbia University Press, 1972); a more reasoned—and better documented—perspective on who did what to whom during the postwar period is offered in Carolyn Eisenberg's recent *Drawing the Line: The American Decision to Partition Germany* (Cambridge, MA: Cambridge University Press, 1996). The bellicosity with which the U.S. received the establishment of the U.S.S.R. from the outset, including participation in a multilateral invasion of Soviet territory in 1918–19 and the relentless hostility with which successive administrations treated the new country during the interwar years, is of course well known. Such facts give rise to the more "radical"—and more accurate—interpretation that a "Cold War" was being waged by the U.S. all along; Denna Frank Fleming, *The Cold War and Its Origins, 1917–1960*, 2 vols. (Garden City, NY: Doubleday, 1961); Desmond Donnelly, *Struggle for the World: The Cold War, 1917–1965* (New York: St. Martin's Press, 1965).

27. On internal security during the period, see, e.g., Alan D. Harper, *The Politics of Loyalty: The White House and the Communist Issue, 1946–1952* (Westport, CT: Greenwood Press, 1969); Walter Goodman, *The Committee: The Extraordinary Career of the House Committee on Un-American Activities* (New York: Farrar, Strauss & Giroux, 1968); Sanford J. Ungar, *FBI: An Uncensored Look Behind the Walls* (Boston: Atlantic-Little, Brown, 1976). For a good range of opinion on Truman's initial postwar strategy, see, e.g.,

Carl Oglesby and Richard Shaull, *Containment and Change: Two Dissenting Views on American Foreign Policy* (New York: Macmillan, 1967); Walter LaFeber, *America, Russia, and the Cold War, 1945–1966* (New York: John Wiley & Sons, 1968); Lloyd Gardner, *Architects of Illusion: Men and Ideas in American Foreign Policy, 1941–49* (Chicago: Quadrangle, 1970).

28. For background, see, e.g., Barbara Tuchman, *Stilwell and the American Experience in China, 1911–45* (New York: Macmillan, 1971); Stanley Karnow, *Mao and China: From Revolution to Revolution* (New York: Viking, 1972); Ranbir Zohra, ed., *The Chinese Revolution, 1900–1950* (Boston: Houghton Mifflin, 1974).

29. NSC 68, which was submitted by the Council to Truman in April 1950, was not declassified until 1975. The complete text is included in Thomas H. Etzold and John Lewis Gaddis, *Containment: Documents on American Foreign Policy and Strategy, 1945–1950* (New York: Columbia University Press, 1978). A fairly candid firsthand account of the context in which the policy was adopted will be found in Dean G. Acheson, *Present at the Creation: My Years in the State Department* (New York: W.W. Norton, 1970).

30. This is not to say that such things did not previously exist in the U.S.—clearly, they did—but that they were greatly amplified, expanded, and systemically perfected after 1950. There is a considerable literature on this score. See, e.g., Morton H. Halperin and Daniel Hoffman, *Freedom vs. National Security* (New York: Chelsea House, 1977) and *Top Secret: National Security and the Right to Know* (Washington, D.C.: New Republic Books, 1977); Richard O. Curry, ed., *Freedom at Risk: Secrecy, Censorship, and Repression in the 1980s* (Philadelphia: Temple University Press, 1988). For more on repression, see Ward Churchill and Jim Vander Wall, *The COINTELPRO Papers: Documents from the FBI's Secret Wars Against Dissent in the United States* (Boston: South End Press, 1990). On the propaganda function, see David Wise, *The Politics of Lying: Government Deception, Secrecy and Power* (New York: Random House, 1973); Edward S. Herman and Noam Chomsky, *Manufacturing Consent: The Political Economy of the Mass Media* (New York: Pantheon, 1988); Noam Chomsky, *Necessary Illusions: Thought Control in Democratic Societies* (Boston: South End Press, 1989); Michael Parenti, *Inventing Reality: The Politics of the News Media* (New York: St. Martin's Press, 1993).

31. For the senator's own definition of his motives and intentions, see Joseph R. McCarthy, *McCarthyism: The Fight for America* (New York: Devon-Adair, 1952). For a contemporaneous opposing view, see Jack Anderson and Ronald W. May, *McCarthy: The Man, the Senator, the "Ism"* (Boston: Beacon Press, 1952). For several good analyses, see Earl Latham, ed., *The Meaning of McCarthyism* (Boston: D.C. Heath, 1965). On the relationship between McCarthy's especially virulent activities after 1950 and the more "liberal" alternative posed by the Truman administration during the late '40s, see Athan Theoharis, *Seeds of Repression: Harry S. Truman and the Origins of McCarthyism* (Chicago: Quadrangle, 1971); Richard M. Freeland, *The Truman Doctrine and the Origins of McCarthyism* (New York: Alfred A. Knopf, 1972); Cedric Belfrage, *American Inquisition, 1945–1960* (Indianapolis: Bobbs-Merrill, 1973).

32. Gyorgy, et al., *No Nukes, op. cit.*, p. 8; on Rocky Flats, see Rapaport, *Great American Bomb Machine, op. cit.*, pp. 31–49.

33. Gyorgy, et al., *No Nukes, op. cit.*, p. 8.

34. Ralph Nader and John Abbotts, *The Menace of Atomic Energy* (New York: W.W. Norton, 1977) pp. 275–6.

35. In effect, the "AEC's contract system of operation [was used to] build up a powerful industrial alliance that protected it against outside appraisal and political attack"; Cultural Workers Collective, *op. cit.*, p. 6.

36. Quoted in Noam Chomsky, *Deterring Democracy* (New York: Hill & Wang, 1992) p. 21.

37. For a good survey of contemporaneous understandings of these effects, see Jack Schubert and Ralph E. Lapp, *Radiation: What It Is and How It Affects You* (New York: Viking, 1958).

38. With respect to the official boundaries of reserved lands, see U.S., Department of Interior, Bureau of Indian Affairs, *American Indian Reservations* (Washington, D.C.: U.S. Government Printing Office, 1979). Concerning unceded treaty territories, see the composite map in my *Struggle for the Land, op. cit.*, p. 57.

39. The SBA provided seed money, the BIA, "administrative oversight," the AEC maintained an ore-buying station on the reservation, near Shiprock, New Mexico; Kinlicheel, "An Overview," *op. cit.*; LaDuke, *History, op. cit.*

40. Richard O. Clemmer, "The Energy Economy and Pueblo Peoples," in Jorgenson, *American Indians, op. cit.*, p. 101.

41. Jack Cox, "Effects of Radiation on Early Miners Comes to Light," *Denver Post*, Sept. 3, 1979; Harold Tso and Laura Mangum Shields, "Navajo Mining Operations: Early Hazards and Recent Innovations," *New Mexico Journal of Science*, Vol. 12, No. 1, Spring 1980.

42. Lynn A. Robbins, "Energy Development and the Navajo Nation: An Update," in Jorgenson, *American Indians, op. cit.*, p. 119. The article referenced is V.E. Archer, J.K. Wagoner and F.E. Lundin, "Lung Cancer Among Uranium Miners in the United States," *Health Physics*, No. 25, 1973. Also see Anthony S. Schwagen and Thomas Hollbacher, "Lung Cancer Among Uranium Miners," in *The Nuclear Fuel Cycle* (Cambridge, MA: Union of Concerned Scientists and Friends of the Earth, 1973); James N. Baker, "Keeping a Deadly Secret: The Feds Knew the Mines Were Radioactive," *Newsweek*, June 18, 1990.

43. J.B. Sorenson, *Radiation Issues: Government Decision Making and Uranium Expansion in Northern New Mexico* (Albuquerque: San Juan Regional Uranium Study Working Paper No. 14, 1978) p. 9.

44. Ibid.; also see Tso and Shields, "Navajo Mining," *op. cit.*

45. Jessica S. Pearson, *A Sociological Analysis of the Reduction of Hazardous Radiation in Uranium Mines* (Washington, D.C.: National Institute for Occupational Safety & Health, 1975).

46. V. E. Archer, J.D. Gillan and J.K. Wagoner, "Respiratory Disease Mortality Among Uranium Miners," *Annals of the New York Academcy of Sciences*, No. 271, 1976; M.J. Samet, et al., "Uranium Mining and Lung Cancer Among Navajo Men," *New England Journal of Medicine*, No. 310, 1984, pp. 1481–4.

47. Tom Barry, "Bury My Lungs at Red Rock: Uranium Mining Brings New Peril to the Reservation," *The Progressive*, Oct. 1976; Chris Shuey, "The Widows of Red Rock," *Scottsdale Daily Progress Saturday Magazine*, June 2, 1979; Reed Madsden, "Cancer Deaths Linked to Uranium Mining," *Deseret News*, June 4, 1979; Susan Pearce and Karen Navarro, "The Legacy of Uranium Mining for Nuclear Weapons," *Earth Island Journal*, Summer 1993.

48. Garrity, "The Pending Energy Wars," *op. cit.*, p. 10.

49. Quoted in Shuey, "Widows," *op. cit.*, p. 4; Archer "conservatively" places the lung cancer rate among Diné miners at 1,000 percent of the national average. Also see Robert O. Pohl, "Health Effects of Radon-222 from Uranium Mining," *Science*, Aug. 1979.

50. Norman Medvin, *The Energy Cartel* (New York: Vintage, 1974); Bruce E. Johansen, "The Great Uranium Rush," *Baltimore Sun*, May 13, 1979.

51. Kinlicheel, "An Overview," *op. cit.*, p. 6.

52. Kulentz, *Geographies of Sacrifice, op. cit.*, p. 31; Reno, *Navajo Resources, op. cit.*, p. 138.

53. Marjane Ambler, *Breaking the Iron Bonds: Indian Control Over Energy Development* (Lawrence: University Press of Kansas, 1990) p. 152. For use of the term employed, see Raye C. Ringholz, *Uranium Frenzy: Boom and Bust on the Colorado Plateau* (Albuquerque: University of New Mexico Press, 1989).

54. Although the entire procedure of dewatering was/is in gross violation of both the Clean Water Act of 1972 (P.L. 92–500; 86 Stat. 816) and the Safe Water Drinking Act of 1974 (P.L. 93–523; 88 Stat. 1660), no charges have ever been brought against Kerr-McGee or any other corporation involved in uranium mining; Ambler, *Breaking the Iron Bonds, op. cit.*, p. 175; "Mine Dewatering Operation in New Mexico Seen Violating Arizona water Standards," *Nuclear Fuel*, Mar. 1, 1982; Christopher McCleod, "Kerr-McGee's Last Stand," *Mother Jones*, Dec. 1980.

55. Clemmer, "Energy Economy," *op. cit.*, pp. 101–2.

56. Lora Mangum Shields and Alan B. Goodman, "Outcome of 13,300 Navajo Births from 1964–1981 in the Shiprock Uranium Mining Area" (New York: unpublished paper presented at the American Association of Atomic Scientists Symposium, May 25, 1984); Christopher McCleod, "Uranium Mines and Mills May Have Caused Birth Defects among Navajo Indians," *High Country News*, Feb. 4, 1985.

57. "Neoplasms Among Navajo Children" (Window Rock, AZ: Navajo Health Authority, Feb. 24, 1981).

58. Laura Mangum Shields, et al., "Navajo Birth Outcomes in the Shiprock Uranium Mining Area," *Health Physics*, Vol. 63, No. 5, 1992.

59. Kulentz, *Geographies of Sacrifice, op. cit.*, pp. 36, 40; quoting from U.S. Department of Health and Human Services, Indian Health Services, *Health Hazards Related to Nuclear Resources Development on Indian*

Land (Washington, D.C.: 97th Cong. 2d. Sess, U.S. Government Printing Office, 1983).

60. It has been estimated that it would require some 400 million tons of earth—enough to cover the entire District of Columbia 43 feet deep—to fill in the Jackpile-Paguate complex; Dan Jackson, "Mine Development on U.S. Indian Lands," *Engineering and Mining Journal*, Jan. 1980. Overall, see U.S. Department of Interior, Bureau of Land Management, *Final Environmental Impact Statement for the Jackpile-Paguate Uranium Mine Reclamation Project*, 2 vols. (Albuquerque: BLM New Mexico Area Office, 1986) vol. 2, p. A-35.

61. Clemmer, "Energy Economy," *op. cit.*, p. 99.

62. Hope Aldrich, "The Politics of Uranium," *Santa Fe Reporter*, Dec. 7, 1978.

63. U.S. Comptroller General, "EPA Needs to Improve the Navajo Safe Drinking Water Program" (Washington, D.C.: U.S. Government Printing Office, Sept. 10, 1980) p. 5.

64. R. Smith, "Radon Emissions: Open Pit Uranium Mines Said to be Big Contributor," *Nucleonics Week*, May 25, 1978; Linda Taylor, "Uranium Legacy," *The Workbook*, Vol. VIII, No. 6, Nov./Dec. 1983.

65. "Manpower Gap in the Uranium Mines," *Business Week*, Nov. 1, 1977. It should be noted that among the things the Labor Department was spending $2 million per year in tax monies to have Kerr McGee train native workers to believe was that "if they [did] not smoke, they [would] not develop lung cancer from exposure to radiation in the mines"; Dr. Joseph Wagoner, quoted in Denise Tessier, "Uranium Mine Gas Causes Lung Cancer, UNM Group Told," *Albuquerque Journal*, Mar. 11, 1980. There seems to have been no protest from the Surgeon General at the peddling of such quasi-official falsehoods. Instead, the country's "chief doctor" endorsed a battery of studies over the next several years, each of them reinforcing the credibility of such lies by purporting to prove that the "number one cause" of lung cancer even among *non*-smokers was the inhalation of "secondhand" cigarette smoke, even in the most minute quantities, rather than exposure to comparatively massive doses of military-industrial pollutants.

66. "Manpower Gap in the Uranium Mines," *op. cit.*; Ambler, *Breaking the Iron Bonds*, *op. cit.*, p. 152.

67. Hoppe, "Stretch," *op. cit.*; LaDuke, "History," *op. cit.*

68. For a good summary of such practices, see Richard Nafziger, "Uranium Profits and Perils," in LaDonna Harris, ed., *Red Paper* (Albuquerque: Americans for Indian Opportunity, 1976).

69. Kinlicheel, "An Overview," *op. cit.*, p. 6.

70. Quoted in Tom Barry, "The Deaths Still Go On: New Agencies Ignored Uranium Danger," *Navajo Times*, Aug. 31, 1978.

71. Freeman, *Nuclear Witnesses, op. cit.*, p. 140.

72. "Uranium-bearing tailings are constantly decaying into more stable elements and therefore emit radiation, as do particles of dust that blow in the wind and truck travel on dirt roads"; Clemmer, "Energy Economy," *op. cit.*, p. 102. Also see David Densmore Comey, "The Legacy of Uranium Tailings," *Bulletin of Atomic Scientists*, Sept. 1975.

73. Hoppe, "Stretch," *op. cit.*; LaDuke, "History," *op. cit.* In instances where milling was done in areas populated by "mainstream citizens," it was sometimes disguised as something else. For example, the AEC hid a milling operation, beginning in 1951, in Fernald, Ohio, near Cincinatti, behind the front that it was a "pet food factory." The ruse worked for 37 years; Helen Caldicott, *If You Love This Planet: A Plan to Heal the Earth* (New York: W.W. Norton, 1992) p. 90.

74. Robbins, "Energy Development," *op. cit.*, p. 121.

75. Simon J. Ortiz, "Our Homeland: A National Sacrifice Area," in his *Woven Stone*, *op. cit.*, pp. 356–8.

76. Robbins, "Energy Development," *op. cit.*, p. 121. It should also be noted that the mill's tailings pile is located only about sixty feet from the San Juan River, Shiprock's only source of surface water, and less than a mile from a daycare center, the public schools and the local business district. The closest residence is less than a hundred yards away; Tso and Shields, "Navajo Mining," *op. cit.*

77. Luther J. Carter, "Uranium Mill Tailings: Congress Addresses a Long Neglected Problem," *Science*, Oct. 13, 1978.

78. See, e.g., the map by Janet Steele entitled "Uranium Development in the San Juan Basin," in Freeman, *Nuclear Witnesses, op. cit.*, p. 139.

79. E.g., the Sohio-Reserve mill at Cebolleta, a mile from the Laguna boundary, processed about 1,500 tons of ore per day during the late 1970s. Its tailings pond covers fifty acres, and the adjoining pile

reached a record 350 feet; Clemmer, "Energy Economy," *op. cit.*, p. 98. Also see Hope Aldrich, "Problems Pile Up at the Uranium Mills," *Santa Fe Reporter*, Nov. 13, 1980.

80. Clemmer, "Energy Economy," *op. cit.*, pp. 97–8.

81. Report by Johnny Sanders (head of Environmental Health Services Branch of the Indian Health Service), T.J. Hardwood (IHS Albuquerque area director) and Mala L. Beard (the district sanitarian) to Laguna Pueblo Governor Floyd Corea, August 11, 1978; copy on file with the Southwest Research and Information Center, Albuquerque. To be "fair" about it, other corporations made similar use of tailings in several backwater non-Indian communities on the Colorado Plateau during this period. These included Moab, Utah, and both Grand Junction and Durango, Colorado.

82. The quantitative release of radioactive substances during the Church Rock spill was several times that of the much more publicized partial meltdown of a reactor at Three Mile Island, near Harrisburg, Pennsylvania, a few months earlier (March 28, 1979); Ambler, *Breaking the Iron Bonds*, *op. cit.*, pp. 175–6; Mark Alan Pinsky, "New Mexico Spill Ruins a River: The Worst Radiation Accident in History Gets Little Attention," *Critical Mass*, Dec. 1979; Anna Mayo, "The Nuclear State in Ascendancy," *Village Voice*, Oct. 22, 1980.

83. Report of the New Mexico Environmental Improvement Division (EID), dated September 9, 1979, on file with the Southwest Research and Information Center, Albuquerque. The ban lasted a year, virtually destroying the limited cash economy of local Diné sheepherders.

84. J.W. Schomish, "EID Lifts Ban on Eating Church Rock Cattle," *Gallup Independent*, May 22, 1980. Moehler is quoted as cautioning the Diné not to eat organ tissues, where the substances are known to "congregate."

85. On the cracks, see Chris Huey, "The Río Puerco River: Where Did the Water Go?" *The Workbook*, No. 11, 1988. On the settlement, see Frank Pitman, "Navajos-UNC Settle Tailings Spill Lawsuits," *Navajo Times*, Apr. 22, 1985. On state facilitation, which took the form of discounting the extent and degree of damage done, see "EID Finds that Church Rock Dam Break Had Little or No Effect on Residents," *Nuclear Fuel*, Mar. 14, 1983. The questions, of course, are why, if there were "no effect," at least one Diné woman and an untold number of sheep sickened and died in 1979 after wading in the Río Puerco, why several other people died under similar circumstances over the next few years, and why the EID itself prohibited use of the river as a drinking water source until 1990, more than a decade after the spill; Loretta Schwarz, "Uranium Deaths at Crown Point," *Ms. Magazine*, Oct. 1979; Molly Ivins, "100 Navajo Families Sue on Radioactive Waste Spill," *New York Times*, Aug. 15, 1980; Ambler, *Breaking the Iron Bonds*, *op. cit.*, p. 176.

86. D.R. Dreeson, "Uranium Mill Tailings: Environmental Implications," *Los Alamos Scientific Laboratory Mini-Report*, Feb. 1978.

87. Box, et al., *Rehabilitation Potential*, *op. cit.*

88. On the extent of Peabody's coal stripping operations on Navajo at the time of the NAS study, see Alvin M. Josephy, Jr., "The Murder of the Southwest," *Audubon Magazine*, July 1971. For a good overview of subsequent expansion and projections, as well as an in-depth assessment of the impact of coal stripping upon the Diné, see my "Genocide in Arizona? The Navajo-Hopi Land Dispute in Perspective," in *Notes From a Native Son: Selected Essays on Indigenism, 1985–1995* (Boston: South End Press, 1996).

89. The Nixon administration reputedly used this vernacular during discussions from 1972 onward. For the first known official print articulation, see U.S. Department of Energy, Federal Energy Administration, Office of Strategic Analysis, *Project Independence: A Summary* (Washington, D.C.: U.S. Government Printing Office, 1974).

90. See generally, Nick Meinhart, "The Four Corners Today, the Black Hills Tomorrow?" *Black Hills/Paha Sapa Report*, Aug. 1979. Also see U.S. Department of the Interior, Bureau of the Census, *1980 Census of Population, Supplementary Reports: Race of the Population of the States by Race, 1980* (Washington, D.C.: U.S. Government Printing Office, 1981) esp. Table 3, "1970"; *1980 Census of the Population, Supplementary Reports: American Indian Areas and Alaska Native Villages* (Washington, D.C.: U.S. Government Printing Office, 1984) esp. Table 4.

91. The statements were made during a speech delivered at the Black Hills International Survival Gathering, near Rapid City, South Dakota, June 12, 1980. The text is included under the title "The Same Old Song," in Ward Churchill, ed., *Marxism and Native Americans* (South End Press, 1983); referenced

material at p. 25. It should be noted that Means' assessment of the severity of the effect of the forced separation of indigenous peoples from their landbase is borne out in the scholarly literature; see, e.g., Thayer Scudder, et al., *No Place to Go: Effects of Compulsory Relocation on Navajos* (Philadelphia: Institute for Study of Human Issues, 1982).

92. Suzanne Ruta, "Fear and Silence at Los Alamos," *The Nation*, Jan. 11, 1993.

93. Concerned Citizens for Nuclear Safety, "LANL [Los Alamos National Laboratory] Deliberately, Secretly Released Radiation on at least Three Separate Occasions in 1950," *The Nuclear Reactor*, Vol. 3, No. 1, Feb.-Mar. 1994.

94. Kulentz, *Geographies of Sacrifice, op. cit.*, pp. 69–70. It appears that legal prohibitions against such "disposal" of nuclear wastes are being circumvented by shipping materials from other DOE facilities to Los Alamos, where they can be secretly burned in the lab's controlled air incinerator. Currently, it is estimated that 1,236 cubic feet of plutonium-contaminated substances are being dispersed in this way each year; Mary Risely, "LANCL Gropes to Find a New Way," *Enchanted Times*, Fall/Winter 1993, p. 6.

95. Ibid.

96. E.g., since 1980, "physicians at the Santa Fe Indian Hospital have noticed an unusual number of thyroid cancer cases [associated with the atmospheric release of radioactive iodides] at the Santa Clara Pueblo, just north of Los Alamos"; Kulentz, *Geographies of Sacrifice, op. cit.*, p. 72. The rate of thyroid cancer at Santa Clara is triple the national average; see the map entitled "New Mexico: A National Sacrifice Area," prepared and distributed by the All People's Coalition, Albuquerque, 1993; reproduced in Kulentz, *Geographies of Sacrifice, op. cit.*, p. 77.

97. Ibid.

98. All research conducted at Lawrence Livermore, for example, would simply be transferred to the "less sensitive environment" of Los Alamos, a move projected as cutting costs while the increasing efficiency of the developmental process; Louis Freedberg, "Livermore: Panel Recommends Ending Nuclear Arms Work," *San Francisco Chronicle*, Feb. 2, 1995.

99. Risely, "LANCL," *op. cit.*

100. Kulentz, *Geographies of Sacrifice, op. cit.*, p. 73; quoting Rosenthal, *At the Heart of the Bomb, op. cit.*, p. 10.

101. Ibid., p. 9.

102. All People's Coalition, "People's Emergency Response Committee," *Enchanted Times*, Summer 1993.

103. "Unlike NRC [Nuclear Regulatory Commission]-regulated industries, DOE [Department of Energy] facilties are not subject to a 7-Curie per year maximum discharge of radioactive wastes into sewers. In fact, DOE's regulations set no limits on the total amount of radioactivity that can be disposed of in a year's time. By simply increasing the amount of water—and thus reducing the [concentration] of radioactive materials—DOE facilities can dump substantial amounts of radioactivity into sewers," which flow directly into the surface water sources for entire regions; All People's Coalition, "Communities Concerned About Potential Radioactive Dumping in Albuquerque Sewers," *Enchanted Times*, Summer 1993.

104. The other, at Savannah River, also closed at this point, has a very bad environmental record as well, but nothing as compared to Hanford; see, e.g., Hartmut Krugman and Frank von Hippel, "Radioactive Wastes: A Comparison of U.S. Military and Civilian Inventories," *Science*, No. 197, Aug. 26, 1977.

105. Elouise Schumacher, "440 Billion Gallons: Hanford wastes could fill 900 King Domes, *Seattle Times*, Apr. 13, 1991.

106. Caldicott, *If You Love This Planet, op. cit.* Also see Susan Wyndham, "Death in the Air," *Australian Magazine*, Sept. 29–30, 1990; Matthew L. Wald, "Wider Peril Seen in Nuclear Waste from Bomb Making," *New York Times*, Mar. 28, 1991.

107. Larry Lang, "Missing Hanford Documents Probed by Energy Department," *Seattle Post-Intelligencer*, Sept. 20, 1991.

108. The upper Chihuahuan Desert area of New Mexico, around Alamagordo, is an environment so harsh that sixteenth-century Spanish explorers dubbed it the "Jornada del Muerto" ("Journey of Death.") It was originally "selected as the best site [for nuclear testing] because it was so remote, the

weather was favorable, and because it was close to the secret laboratory where the weapon was being created"; Tad Bartimus and Scott MacCartney, *Trinity's Children: Living Along America's Nuclear Highway* (Albuquerque: University of New Mexico Press, 1991) pp. 11, 13. On Hiroshima and Nagaski as tests, see Anthony Robbins, Arjun Makhijani and Katherine Yih, *Radioactive Heaven and Earth: The Health and Environmental Effects of Nuclear Weapons Testing In, On, and Above the Earth* (New York/London: Apex Press/Zed Books, 1991) pp. 49–50.

109. Kulentz, *Geographies of Sacrifice, op. cit.*, p. 78. "What became a small drop zone for training bombers grew as planes became larger and faster and squadrons of pilots had to be quickly trained. More land was needed, so ranchers were told to move out. Some were curtly informed at gunpoint that the Army was leasing their land until the end of the war. The army would pay rent, then return their land. They had two weeks to vacate"; Bartimus and MacCartney, *Trinity's Children, op. cit.*, p. 11. The army lied. The ranchers' dispossession was, in fact, permanent, and compensation for lost property was ultimately made at rates the government, not the owners, decided was "fair." The same principle pertained to portions of "remote" American Indian reservations—e.g. Pine Ridge and Spokane—impounded by the military for use as gunnery and bombing practice ranges during World War II, and in which uranium deposits were later discovered; see, e.g., Jacqueline Huber, et al., *The Gunnery Range Report* (Pine Ridge, SD: Office of the President, Oglala Sioux Tribe, 1981).

110. Kulentz, *Geographies of Sacrifice, op. cit.*, pp. 79–80; she is quoting from Bartimus and MacCartney, *Trinity's Children, op. cit.*, p. 32. At p. 40, the latter explain that the "conventional weapon" with which a nuclear blast is simulated is "a bomb that sprays a fine mist of fuel for miles, then erupts in a conflagration that literally sucks molecules out of soldiers."

111. Ibid., p. 40.

112. See "New Mexico: A National Sacrifice Area," *op. cit.*

113. The neglect exhibited by the government in studying the effects of systemically generated radioactive by-products on indigenous populations is, as has already been indicated, notorious. This is as distinguished from instances such as Rongelap and Utirik, where isolated populations seem to have been deliberately exposed for test purposes, and the north slope of Alaska, where a sample group of Inuits were unknowingly fed doses of uranium during the mid-'50s so that the effects might be studied; Valerie Taliman, "Nuclear Guinea Pigs: Native People Were on the Front Lines of Exploitation," *Native American Smoke Signals*, Jan. 1994. One indicator of the situation at Mescalero is that overall childhood leukemia rates among downwinders appear to run at about 2.5 times the national average; *Human and Environmental Effects of Nuclear Testing* (Albuquerque: unattributed activist handout, 1991).

114. David Loomis, *Combat Zoning: Military Land-Use Planning in Nevada* (Las Vegas: University of Nevada Press, 1994) p. 10; citing Michael Skinner, *Red Flag* (Novato, CA: Presidio Press) p. 52. For a more comprehensive overview of how all this evolved, see Gerald D. Nash, *The American West Transformed: The Impact of the Second World War* (Bloomington: University of Indiana Press, 1985).

115. Loomis, *Combat Zoning, op. cit.*, pp. 9–10.

116. Although the United States has long ocupied the area, exhaustive effort by the Indian Claims Commission during the 1960s and '70s could find no evidence that the Indians had ever transferred title; see, e.g., Dagmar Thorpe, *Newe Segobia: The Western Shoshone People and Land* (Lee, NV: Western Shoshone Sacred Lands Association, 1982); Steven J. Crum, *The Road on Which We Came: A History of the Western Shoshone* (Salt Lake City: University of Nevada Press, 1994).

117. Newe Chief Raymond Yowell, quoted in Taliman, "Nine Tribes," *op. cit.* Also see the subsection, "The Most Bombed Nation in the World," in Bernard Neitschmann and William Le Bon, "Nuclear Weapons States and Fourth World Nations," *Cultural Survival Quarterly*, Vol. 11, No. 4, 1987, pp. 5–7.

118. For estimates of atmospheric releases, see Carole Gallegher, *America Ground Zero: The Secret Nuclear War* (New York: Random House, 1993).

119. Kulentz, *Geographies of Sacrifice, op. cit.*, p. 94.

120. Ibid., pp. 93–4; also see Loomis, *Combat Zoning, op. cit.*, p. viii.

121. China Lake, which encompasses 38 percent of the Navy's total land holdings, supports about 1,000 military personnel and over 5,000 civilian scientists, engineers and technicians in more than 1,100 buildings on an annual budget of nearly $1 billion; Kulentz, *Geographies of Sacrifice, op. cit.*, p. 84.

122. China Lake commands some 20,000 square miles of air space, as do each of the other three facilities. Quite literally, the sky over the entire Mojave has been appropriated by the military; Loomis, *Combat Zoning, op. cit.*, p. 70.

123. U.S. Navy, *Naval Weapons Center Silver Anniversary* (China Lake Naval Weapons Center: Technical Information Dept. Publishing Division, Oct. 1968).

124. Robbins, Makhijani and Yee, *Radioactive Heaven, op. cit.*, p. 66.

125. Underground detonations of nuclear devices all but invariably cause fissures leading to groundwater contamination of the sort evident in Nevada; Office of Technology Assessment, *The Containment of Underground Nuclear Explosions* (Washington, D.C.: U.S. Government Printing Office, 1989). Also see David Hulen, "After the Bombs: Questions Linger About Amchitka Nuclear Tests," *Anchorage Daily News*, Feb. 7, 1994.

126. As one of Plowshare's leading proponents, AEC Chairman Glenn T. Seaborg , put it at the time: "Large nuclear explosives give us, for the first time, the capability to remedy nature's oversights"; Seaborg and Corliss, *Man and Atom, op. cit.*, p. 188. Another individual who consistently confused himself with God in this manner was Edward Teller, the psychopathic "father of the hydrogen bomb" who replaced Robert Oppenheimer as the preeminent figure in America's "nuclear scientific community"; see, e.g., Edward Teller, et al., *Constructive Uses of Nuclear Explosives* (New York: McGraw-Hill, 1968). Overall, see C.R. Gerber, R. Hamburger and E.W.S. Hull, *Plowshare* (Washington, D.C.: Atomic Energy Commission, 1967). For oppositional views, see Richard Curtis and Elisabeth Hogan, *Perils of the Peaceful Atom* (New York: Ballantine, 1969).

127. On the "New Panama Canal" project, see R. Sanders, *Project Plowshare: The Development of Peaceful Uses of Nuclear Explosives* (Washington, D.C.: Public Affairs Press, 1962). On Project Ketch, see Gyorgy, et al., *No Nukes, op. cit.*, pp. 382, 415; Richard S. Lewis, *The Nuclear Power Rebellion: Citizens vs. the Atomic Industrial Establishment* (New York: Viking, 1972) pp. 207–20.

128. Gyorgy, et al., *No Nukes, op. cit.*, p. 443; Freeman, *Nuclear Witnesses, op. cit.*, p. 66.

129. After the blast itself, the AEC vented "hundreds of millions of cubic feet" of radioactive gas from the resulting subsurface pocket in the vain hope that once the upper levels were thus dispensed with, the remainder might be suitable for commercial sale. All that resulted was a substantial atmospheric dispersal of radioactive substances, especially tritium and krypton 851 across the Navajo Nation; *Nuclear Explosives in Peacetime* (Denver: Scientists Institute for Public Information, 1977) pp. 4–5.

130. Freeman, *Nuclear Witnesses, op. cit.*, p. 68; Gyorgy, et al., *No Nukes, op. cit.*, p. 443.

131. Project Gasbuggy cost some $56 million, returning as much as $18–25 million in useless gas. Project Rulison cost over $11 million and produced about $1.5 million in useless gas. The tab for Project Río Blanco was about $12 million, and the other five detonations a total of just under $60 million. They produced no gas at all; James Robertson and John Lewallen, eds., *The Grass Roots Primer* (San Francisco: Sierra Club Books, 1975) pp. 125–35; Gyorgy, et al., *No Nukes, op. cit.*, pp. 13, 443.

132. On "Banebury," see Robbins, Makhijani and Yih, *Radioactive Heaven, op. cit.*, p. 64. By 1977, it had been revealed that several other underground tests had also vented themselves into the atmosphere, notably the twelve kiloton "Palanquin" device, detonated in April 1965; *Nuclear Explosives in Peacetime, op. cit.*, p. 11. Also see Richard Misrach and Myriam Weisang Misrach, *Bravo Twenty: The Bombing of the American West* (Baltimore: Johns Hopkins University Press, 1990).

133. Kristen Ostling and Joanna Miller, *Taking Stock: The Impact of Militarism on the Environment* (New York: Science for Peace, 1992).

134. Southwestern Arizona also includes another pair of huge military complexes, the half-million-acre Yuma Proving Grounds and adjoining million-acre Luke Air Force Base, both of which engage in activities comparable to those evident at White Sands and China Lake; see generally, Ostling and Miller, *Taking Stock, op. cit.*; Thomas, *op. cit.* The three native peoples in question are thus completely encircled by these facilities to their south, southern California's constellation of bases and test ranges to their west, the Nevada Test Site and related areas to their north, and the Navajo sacrifice zone to their east.

135. P.Z. Grossman and E.S. Cassedy," "Cost Benefit Analysis of Nuclear Waste Disposal," *Science, Technology and Human Values*, Vol. 10, No. 4, 1985.

136. Current planning now entails a "force reduction" in the number of such weapons to 3,500

by the year 2003; Charles Pope, "Nuclear Arms Cleanup Bill: A Tidy $230 Billion," *San Jose Mercury News*, Apr. 4, 1995. The figure advanced here as constituting the "cleanup bill" is low by more than half. The reason for this is that it is based on modes/levels of "site rehabilitation" which leave every location at issue in a highly irradiated condition.

137. Pope, "Nuclear Arms," *op. cit.*

138. U.S. Department of Energy, Office of Environmental Management, *Estimating the Cold War Mortgage: The 1995 Baseline Environmental Management Report* (Washington, D.C.: DOE/EM-0232, Mar. 1995); *Closing the Circle of the Closing of the Atom: The Environmental Legacy of Nuclear Weapons Production in the United States and What the Department of Energy is Doing About It* (Washington, D.C.: DOE/EM-0228, Jan. 1995).

139. John H. Hollocher, "The Storage and Disposal of High Level Wastes," in *The Nuclear Fuel Cycle, op. cit.*; U.S. Department of Energy, Office of Environmental Management, *Environmental Management 1995* (Washington, D.C.: DOE/EM-0228, Feb. 1995).

140. For analysis of the defects in this proposition, see Arjun Makhijana and Scott Saleska, *High-Level Dollars, Low-Level Sense: A Critique of Present Policy for the Management of Long-Lived Radioactive Wastes and Discussion of an Alternative Approach* (Takoma Park, MD: Institute for Energy and Environmental Research, 1992).

141. The Groundwork Collective, "The Illusion of Cleanup: A Case Study at Hanford," *Groundwork*, No. 4, Mar. 1994, p. 14. For the record, the classification scheme involved here, which is incorporated into the 1982 Nuclear Waste Policy Act (P.L. 97–425; 96 Stat. 2201), is problematic. The term "high-level wastes" pertains to spent fuel from nuclear power plants subject to reprocessing for extraction of plutonium and uranium-235. "Transuranic wastes" include substances like plutonium, neptunium, and americium, "bred" from uranium-238. "Low-level wastes" include materials—e.g., worn-out reactor parts—contaminated by exposure to high-level or transuranic substances. The classifications don't necessarily correspond to the degree of threat posed by a given material, only to the nature of the process by which it was produced; Concerned Citizens for Nuclear Safety, *The Nuclear Reactor*, Early Spring 1995.

142. Although tailings cleanup is hypothetically mandated by the Uranium Mill Tailings Radiation Control Act of 1978 (P.L. 95–604; 92 Stat. 3021), the program has been so chronically underfunded that it didn't really get started at all for eight years. When it did, its efforts consisted largely of moving tailings piles from particularly sensitive locations—such as downtown Edgemont, South Dakota, where the AEC had dumped about 3.5 million tons along the banks of the Cottonwood Creek, a quarter-mile upstream from the Cheyenne River—and relocating them to some "preferable" spot a few miles away, where they could be fenced-off for "safety" reasons; Carter, "Uranium Mill Tailings," *op. cit.*; Ambler, *Breaking the Iron Bonds*, *op. cit.*, pp. 178–90; Peter Matthiessen, *Indian Country* (New York: Viking, 1984) pp. 203–18. Arguably, the dispersal involved in such procedures worsens rather than alleviates the problem. The plain fact is that nobody has a clue what to do this body of carcinogenic material which, by the mid-'70s, was already large enough to "cover a four lane highway one foot deep from coast to coast"; Jeff Cox, "Nuclear Waste Recycling," *Environmental Action Bulletin*, No. 29, May 1976.

143. The need for permanent repositories was formally enunciated for the first time in the Nuclear Waste Policy Act of 1982 (NWPA); the two-part scheme, authorizing establishment of MRS facilities as well as repositories, was included in the 1987 revision of NWPA; U.S. Department of Energy, Monitored Retrievable Storage Commission, "Nuclear Waste: Is There a Need for Federal Interim Storage?" in *Report of the Monitored Retrievable Storage Commission* (Washington, D.C.: U.S. Government Printing Office, 1989); Gerald Jacob, *Site Unseen: The Politics of Siting a Nuclear Repository* (Pittsburg: University of Pittsburg Press, 1990). For insight into the evolution of official thinking on the matter of nuclear waste disposal, see J. Samuel Walker, *Containing the Atom: Nuclear Regulation in a Changing Environment, 1963–1971* (Berkeley: University of California Press, 1992).

144. Valerie Taliman, "Nine Tribes Look at Storage: Signs Point to Nuclear Dump on Native Land, *Smoke Signals*, Aug. 1993.

145. In 1995, the few residents of, Lincoln County, Nevada, attempted to negotiate a hefty fee for themselves in exchange for accepting an MRS. The state government quickly quashed the initiative; Kulentz, *Geographies of Sacrifice, op. cit.*, p. 145.

146. For full exposition of the relevant legal theory, see the references indicated in notes 3 and 7, above.

147. Grace Thorpe, "Radioactive Racism? Native Americans and the Nuclear Waste Legacy," *The Circle*, Apr. 1995. To amplify, in federal doctrine, "Indian reservations...are 'sovereign'—outside the immediate control of the states in which they reside. They are also outside the control of government agencies such as the Environmental Protection Agency... Because they are often extremely impoverished, they are [also] vulnerable to bribes"; ibid., p. 147.

148. Taliman, "Nine Tribes Look at Storage," *op. cit.*

149. On the NCAI grant, see Randel D. Hansen, "Mescalero Apache: Nuclear Waste and the Privatization of Genocide," *The Circle*, Aug. 1994. On the CERT funding, see Winona LaDuke, "Native Environmentalism," *Earth Island Journal*, Summer 1993. CERT, created in the late 1970s by then Navajo Tribal Chairman Peter McDonald and federal lobbyist LaDonna Harris, has long been a major problem for those pursuing indigenous sovereignty and mineral rights; for what is probably the best analysis, see Philip S. Deloria, "CERT: It's Time for an Evaluation," *American Indian Law Newsletter*, Sept./Oct. 1982. Also see Geoffrey O'Gara, "Canny CERT Gets Money, Respect, Problems," *High Country News*, Dec. 14, 1979; Ken Peres and Fran Swan, "The New Indian Elite: Bureaucratic Entrepeneurs," *Akwesasne Notes*, Late spring 1980; Winona LaDuke, "CERT: An Outsider's View In," *Akwesasne Notes*, Summer 1980.

150. The lease, which will soon expire, generates about 90 percent of the reservation's revenues. Without the MRS facility, the Goshutes would not only continue to suffer a high degree of contamination, but be totally without income as well; Kulentz, *Geographies of Sacrifice, op. cit.*, p. 152.

151. Quoted in Randel D. Hanson, "Nuclear Agreement Continues U.S. Policy of Dumping on Goshutes," *The Circle*, Oct. 1995.

152. Unidentified Mescalero, quoted in Winifred E. Frick, "Native Americans Approve Nuclear Waste Dump on Tribal Lands," *Santa Cruz on a Hill Press*, Mar. 16, 1995.

153. Quoted in ibid.

154. Such a sense of emotional/spiritual malaise is hardly unique to Indians, albeit it may manifest itself especially strongly among groups like the Mescaleros, who are placed in extremis; see Joanna Rogers Macy, *Despair and Personal Power in the Nuclear Age* (Baltimore: New Society, 1983).

155. National Academy of Sciences, Division of Earth Science, Committee on Waste Disposal, *The Disposal of Radioactive Waste on Land* (Washington, D.C.: NAS-NRC Pub. 519, 1957); Scientists' Review Panel on the WIPP, *Evaluation of the Waste Isolation Pilot Plant (WIPP) as a Water Saturated Nuclear Waste Repository* (Albuquerque, NM: Concerned Citizens for Nuclear Safety, Jan. 1988).

156. "Scientists Fear Atomic Explosion of Buried Waste," *New York Times*, Mar. 5, 1995.

157. Kulentz, *Geographies of Sacrifice, op. cit.*, p. 133.

158. About 10 percent of Yucca Mountain's capacity is earmarked for military wastes. As to civilian waste, it will have been outstripped by the output of the country's 128 functioning commercial reactors before it is completed. Hence, a third repository is already necessary; ibid., p. 140.

159. Jacob, *Site Unseen, op. cit.*, p. 138.

160. By some estimates, it will be open for business by the turn of the century.

161. The Low-Level Radioactive Waste Policy Act of 1980 makes the states responsible for the disposal of such materials, even if they've been federally/militarily produced (as they almost invariably are, to some extent). California Governor Pete Wilson has apparently opted to "assume the burden" of all 49 of his cohorts—on a fee-for-service basis—by dumping the aggregate contamination on a handful of Indians in a remote and unnoticed corner of his vast domain; Philip M. Klasky, "The Eagle's Eye View of Ward Valley: Environmentalists and Native American Tribes Fight Proposed Waste Dump in the Mojave Desert," *Wild Earth*, Spring 1994.

162. The phrase does not accrue from "radical" rhetoric. See the unabashed advocacy of the trend, both technically and politically, advanced in Charles C. Reith and Bruce M. Thompson, eds., *Deserts as Dumps? The Disposal of Hazardous Materials in Arid Ecosystems* (Albuquerque: University of New Mexico Press, 1992).

163. For a more panoramic view of the phenomenon in its various dimensions, see Donald A. Grinde and Bruce E. Johansen, *Ecocide of Native America: Environmental Destruction of Indian Lands and Peoples* (Santa Fe, NM: Clear Light, 1995).

164. Cohen is mainly known for his definitive *Handbook on Federal Indian Law*, originally published in 1942 and periodically updated by a succession of scholars ever since. For the miner's canary analogy, see Felix S. Cohen, "The Erosion of Indian Rights, 1950–53: A Case-Study in Bureaucracy," *Yale Law Journal*, No. 62, 1953, p. 390.

165. Such experimentation has been by no means restricted to the effects of radioactive substances. Consider, for example, the testing during the late '80s/early '90s of hepatitis vaccines indirectly linked by the World Health Organization to AIDS, on unwitting Inuit and American Indian children; Andrea Smith, "The Correlation of HIV to Hepatitis-A and -B Vaccines," *WARN Newsletter*, Summer 1992.

166. While the great weight of this has fallen on Native North America (Grinde and Johansen, *Ecocide of Native America, op. cit.*), much has also been pushed off on other oppressed population sectors, most especially peoples of color; see, e.g., Robert D. Bullard, ed., *Confronting Environmental Racism: Voices from the Grassroots* (Boston: South End Press, 1993); Andrew Szaz, *Ecopopulism: Toxic Waste and the Movement for Environmental Justice* (Minneapolis: University of Minnesota Press, 1994).

167. It should be noted that early mainstream dissident movements of the late '50s/early '60s, like SANE and Women Strike for Peace, were opposed specifically to proliferation of nuclear weapons, not the development of nuclear power per se. There is no hint in their literature that they were concerned that something akin to genocide might be occurring among indigenous peoples in the mining and milling districts of North America; see, e.g., Arthur J. Laflin and Anne Montgomery, eds., *Swords into Plowshares: Nonviolent Direct Action for Disarmament* (San Francisco: Harper & Row, 1987).

168. One firm indication of this is that in a book like Anna Gyorgy's *No Nukes* (*op. cit.*), a more or less definitive survey text put forth by one of the country's premier oppositional publishing houses at the very height of the anti-nuclear movement, only three of 484 pages are devoted to indigenous people. This is true, despite the acknowledgement, at p. 221, that "Native Americans...are affected more than others" by the politicoeconomic and sheer physical structure of nuclear power. In effect, had *only* American Indians been substantially impacted by "the scourge of nuclear energy" (p. 13), opposition would have been minimal to nonexistent, even among the dominant society's self-styled radicals.

169. On the reactors and their safety record, see John W. Gofman and Arthur R. Tamplin, *Poisoned Power: The Case Against Nuclear Plants* (Emmaus, PA: Rodale Press, 1971; rereleased in 1979 with a new subtitle, *The Case Before and After Three Mile Island*); Peter Faulkner, *The Silent Bomb: A Guide to the Nuclear Power Controversy* (New York: Vintage, 1977).

170. Kulentz, *Geographies of Sacrifice, op. cit.*, p. 115.

171. Wiesen Cook, "Cold War Fallout," *op. cit.*, p. 31; her reference is to Jay M. Gould, *The Enemy Within: The High Cost of Living Near Nuclear Reactors* (New York: Four Walls Eight Windows, 1996).

172. John W. Gofman and Arthur R. Tamplin, *Population Control Through Nuclear Pollution* (Chicago: Nelson-Hall, 1970).

173. Quoted in Freeman, *Nuclear Witnesses, op. cit.*, p. 112; the reference is to Linus Pauling, *No More War* (New York: Dodd, Meade, 1958).

174. Gene I. Rochlin, *Plutonium, Power, and Politics* (Berkeley: University of California Press, 1979).

175. U.S. Department of Energy, Nuclear Information and Resource Service, *Nuclear Power and National Energy Strategy* (Washington, D.C.: U.S. Government Printing Office, 1991).

176. It is very interesting that with all the hullabaloo during the past five years over "Joe Camel" and other tobacco advertising campaigns—all of which should probably be banned—there was almost no response from progressives with regard to the far more ominous pronuke ads. Whatever else may be said, simple arithmetic demonstrates that the combined carcinogenic content of all the cigarettes in the world, even if inhaled directly rather than second hand, is relatively benign when compared to a single pound of plutonium.

177. Ambler, *Breaking the Iron Bonds, op. cit.*, p. 173.

178. Uranium mining in northern Saskatchewan began on a fairly small scale in 1952, at an ersatz government-sponsored community called Uranium City. It expanded during the uranium boom of the late 1970s, and really took off after the collapse of U.S. uranium production at the end of the decade. As at Navajo, Laguna, and elsewhere, indigenous habitats and subsistence economies have been devastated as a result; see Miles Goldstick, *Wollaston: People Resisting Genocide* (Montréal: Black Rose Books, 1987). For

an earlier but much broader overview of such processes, see Robert Davis and Mark Zannis, *The Genocide Machine in Canada: The Pacification of the North* (Montréal: Black Rose Books, 1973).

179. Alex Haley, *The Autobiography of Malcolm X* (New York: Ballantine, 1964) p. 329.

180. Rosalie Bertell, "Radiation Exposure and Human Species Survival," in Committee on Federal Research on the Effects of Ionizing Radiation, *Issue Papers: Working Documents of 10 March 1980 Public Meeting, Vol. 1* (Washington, D.C.: National Institutes of Health, 1980); also see her "Nuclear Suicide," *op. cit.*; "More on Nuclear Suicide," *op. cit.*

181. Gould, *The Enemy Within, op. cit.*

182. This is a concept embodied in most, if not all, traditional (indigenous) societies. It has been increasingly incorporated into—more often appropriated by—a fairly broad range of non-native environmentalist theory and activism; see, e.g., Caldicott, *If You Love This Planet, op. cit.*; Vandana Shiva, *Staying Alive: Women, Ecology and Development* (London: Zed Books, 1989); Christopher Manes, *Green Rage: Radical Environmentalism and the Unmaking of Civilization* (Boston: Little Brown, 1990); Paul Virilio, *Popular Defense & Ecological Struggles* (New York: Semiotext[e], 1990); Barry Commoner, *Making Peace with the Planet* (New York: New Press, 1990); Kirkpatrick Sale, *Dwellers in the Land: The Bioregional Vision* (Philadelphia: New Society, 1991); Steve Chase, ed., *Defending the Earth: A Dialogue Between Murray Bookchin and Dave Foreman* (Boston: South End Press, 1991); Jerry Mander, *In the Absense of the Sacred: The Failure of Technology and the Survival of the Indian Nations* (San Francisco: Sierra Club Books, 1991); John Zerzan, *Future Primitive and Other Essays* (Brooklyn, NY: Autonomedia/Anarchy, 1994).

183. This is a theme elaborated very well by Vine Deloria, Jr., in his *God Is Red* (Golden, CO: Fulcrum, [2nd. ed.] 1994).

184. See, e.g., Lewis Regenstein, *The Politics of Extinction* (New York: Macmillan, 1975).

185. The fact that ground has been broken for no new reactor since the late 1980s is, of course, a good sign; Gould, *The Enemy Within, op. cit.*, p. 241.

186. See generally, Frank Donner, *Protectors of Privilege: Red Squads and Police Repression in Urban America* (Berkeley: University of California Press, 1990); Paul Chevigny, *Edge of the Knife: Police Violence in America* (New York: New Press, 1995).

187. In January 1975, the Virginia Electric and Power Company, a utility operating two nuclear reactors and planning four more, became the first such entity to ask for and receive legislative approval to establish a private police force with investigative and arrest prerogatives. On September 9, 1977, it was revealed that a similar unit, created by the George Power Company, was surveilling and compiling files on antinuclear activists. Things have gone steadily downhill from there; Susan Jaffe, "Repression: The New Nuclear Danger," *Village Voice*, Mar. 31, 1980.

188. On sizes and powers of public and private police forces, see Mike Zielinski, "Armed and Dangerous: Private Police Forces on the March," *Covert Action Quarterly*, No. 54, Fall 1995. With respect to files, see, e.g., Fred Hoffman, "Inside the L.A. Secret Police," *Covert Action Quarterly*, No. 42, Fall 1992. Concerning prisons, more citizens are currently behind bars in "the land of the free," proportionately speaking, than in any other country on earth. Official plans include a doubling of lockup capacity by early in the coming century; Marc Bauer, "Americans Behind Bars: A Comparison of International Rates of Incarceration," in Ward Churchill and J.J. Vander Wall, eds., *Cages of Steel: The Politics of Imprisonment in the United States* (Washington, D.C.: Maisonneuve Press, 1992).

189. There is simply no substitute for U-238. Neither plutonium nor U-235 can be synthesized without it, and the thorium-derived U-233 does not fulfill the same requirements; David R. Inglis, *Nuclear Energy: Its Physics and Social Challenge* (Reading, MA: Addison-Wesley, 1973).

190. The term decolonization is employed here in precisely the sense articulated as a fundamental human right under international law, to wit, the United Nations Declaration on the Granting of Independence to Colonial Countries and Peoples, 1960 (U.N.G.A. Res. 1514 (XV), 15 U.N. GAOR, Supp. (No. 16) 66, U.N. Doc. A/4684 (1961)).

191. Quoted in Virginia Irving Armstrong, ed., *I Have Spoken: American History Through the Eyes of American Indians* (Chicago: Swallow Press, 1971) p. 79.